Journal
OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION

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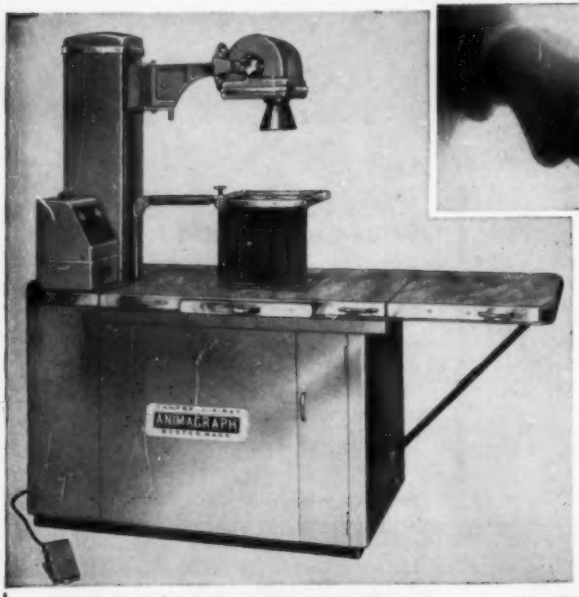

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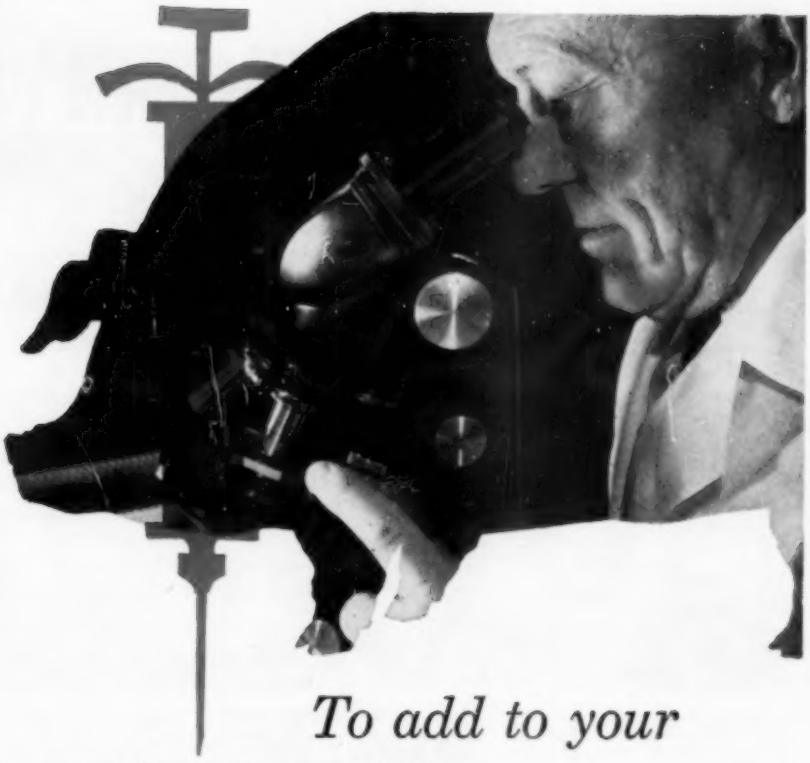

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**Jones, S. V.; Belloff, G. B., and Roberts, H. D. B.: Vet. Med. In Press.*

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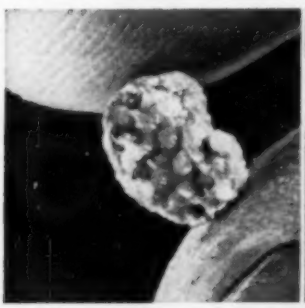

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AVMA ☆ Report

Because AVMA activities, in a number of related fields, have expanded rapidly the past few years, these activities will be reported both in the AVMA Report and the "Organization Section," which was established to report purely AVMA matters when the JOURNAL became a semimonthly in January, 1956.

Beginning with this issue, remarks made and papers presented at the "Preconvention Conference on Public Relations," held Oct. 14, 1956, during the AVMA Convention in San Antonio, will be published here as well as the "Organization Section."

The "News from Washington" will continue to appear in this space in alternate issues (15th of the month).

Your Public Relations Responsibilities

Floyd Cross, D.V.M.
Fort Collins, Colo.

Presented at the AVMA Public Relations Conference, San Antonio, Oct. 14, 1956, by President Cross.

The matter of public relations is one that I do not feel particularly well qualified to speak about. Public relations, in my opinion, is the science of conducting your public affairs so that you create a desirable public opinion. Now, public opinion is a constant pressure which is always present. It is nebulous; it is fickle; but do not forget that it is always there.

Public opinion—and it is useless to try to enlarge upon this because you know it yourselves—makes empires; decides elections; decides the profit and loss of a company, industry, commerce; the fate of public institutions, and it has great bearing upon professions and all other walks of life. So, we can not ignore public opinion. We create it with proper public relations. I feel that the veterinarian has been a little lax in this area. I think it is understandable. After the veterinarian gets his education, he goes into practice.

His daily routine causes him to make individual decisions in the matter of diagnosis, treatment, and all the things pertaining to his profession. When he makes these decisions, he usually does not consult anyone. Therefore, he becomes an independent individual who makes final decisions. He is not a member of a team, nor does he particularly understand team play.

Relations with Our Colleagues

He is well educated in the understanding of animals, but his understanding of man is not particularly well developed. Nor is that true only of the veterinarian, because I think it can be said that man's relationship to man has changed but little since the beginning of recorded history. We have made little progress in this field. We have much to do with developing proper public relations within the profession itself. Our relationships with one another, with our colleagues, is not particularly good. That it has been improving, I am willing to admit, because I have observed it for many years. But we have far to go.

I can not separate public relations from ethics, in my way of thinking. They are so closely related that I get them all mixed up.

Ethics is merely the moral conduct of man in his relationships with others. If you do that well, you are probably doing a pretty good public relations job.

To sum this whole thing up: This is the way I feel about ethics. The American Veterinary Medical Association can and should have a code of ethics, and does have. We are obligated to try to enforce that code of ethics. We are certainly obligated to encourage all in our profession to follow, but ethics, gentlemen, is a personal thing.

The AVMA does not have ethics. You, the members of the profession, have the ethics, or you do not have them. The same thing is true, in my opinion, with public relations. It is a personal matter. If you conduct yourself well and decently in so far as your fellow members of the profession are concerned, you have taken the first step in public relations and in ethics.

Relations with the Public

The other phase of this problem is our relationship with the public at large. We must not only create good public relations within the profession, but we must sell our profession and put it before the public in

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such fashion that they can see what we do, what we are trying to accomplish, and respect and support us for it. We have not done that very well.

We have this program of public information in the AVMA, which we are trying to develop, to expand. That is the first step, I am sure.

Again I say to you that the best public relations come from the individual members of the profession, in their daily relationships with their clients and others. It is true that the individual member must be a respectable citizen. It is desirable that he take part in civic affairs. It is important that he become a respected member of the community, and one on which the community depends.

It is necessary that he know his clients well, and create in them a personal respect for himself and for the profession. He is not performing his duties, in my opinion, if he is thinking only of what his clients think of him individually. He must always sell the profession to the client. We are negligent, but we do not mean to be.

I am going to say this again but I want to say it here: During the term that I have served as president-elect and president of your Association, I have traveled the length and breadth of this country to appear before many groups. This itinerary was sponsored by the Association. I tried to go wherever I was invited, although sometimes I could not because of conflicts.

I was invited only once during this period of two years to speak to a nonveterinary group—the Nebraska Cattlemen's Association, at their invitation and at the AVMA's expense. I am not trying to say that, if I could have gotten before these groups—livestock associations, the feed men, all men that are interested or might be interested in the livestock industry or in our profession—I should have talked to them. I am not saying I could have done it well. I did not have the opportunity or the invitation to appear before them, so I can not report what I might have done.

Now, we must be conscious, in these meetings with the people who are our clients and on whom we rely for support, of the duties that we have in bringing them into the fold to support our endeavors.

You take the matter of college institutions. The veterinary schools are the keystone to the profession of veterinary medicine. As the veterinary school goes, so goes the profession. When the schools of veterinary medicine begin to deteriorate, so does the profession. All of these veterinary schools are state-supported, with the exception of one. There is only one pipeline through which this money comes that supports these institutions, and that is the pipeline that leads from the state legislature.

If the men of our profession were alert to the public relations, they could exert a profound influence upon these legislators, because you have daily personal contact with many of their constituents. You are not doing that very well, but better than you used to. I know of no profession that is trying harder to advance and keep abreast of the times, and streamline its organization, than the veterinary profession.

It is necessary that we follow through on this program, gentlemen, and we will go much, much further than you think. I am optimistic about the future.

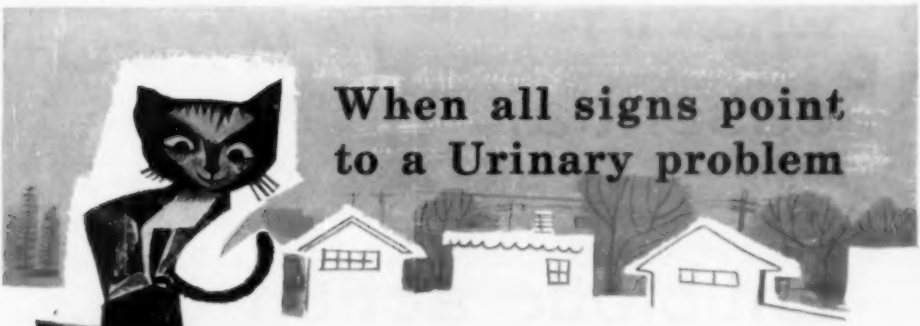
Can You Use a Foreign Graduate Assistant?

Recent developments in Hungary have greatly accentuated the problem of placing foreign graduate veterinarians who are among the refugees brought to this country under government and private auspices. The AVMA receives many appeals to find professional employment for foreign graduate veterinarians from Hungary and other European countries.

Most of these displaced veterinarians have had practice experience, others have done disease control, food sanitation, or other work in their homelands.

An occasional offer to employ a foreign graduate is received at AVMA headquarters but the appeals far outnumber the offers.

Any U.S. veterinarian who can utilize a foreign graduate assistant in his practice or hospital is urged to communicate with the AVMA, 600 S. Michigan Ave., Chicago 5, Ill.



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JOURNAL
of the American Veterinary Medical Association
Chicago 5, Illinois

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Responsibility of State and Federal Agencies in Control of Animal Diseases Transmissible to Man

C. D. VAN HOUWELING, D.V.M.

Washington, D. C.

AS VETERINARIANS become more widely and actively engaged in work organized under governmental agencies and a variety of political subdivisions, it is increasingly important that we as individuals and as a profession understand the interrelationships of these agencies. This has become even more important in recent years with the extension of interest by veterinarians into the field of human health in association with public health departments.

The various areas of interest of governmental agencies are referred to as "areas of jurisdiction." The term "jurisdiction" refers to the ability to exercise authority. This authority is best understood in terms of responsibility inherent in the governmental agencies' geographical and organizational location, and by the wording of applicable statutes authorizing their activities.

This discussion will deal only with the responsibility of the Agricultural Research Service, U. S. Department of Agriculture, rather than the entire field of federal agencies. In general, I believe that the responsibilities and authority of the U.S.D.A. on a national level are comparable to those of state veterinarians on a state level, with regard to diseases of animals that are transmissible to man.

In the U.S.D.A., the responsibilities for these diseases are delegated to four branches of the Agricultural Research Service, namely, meat inspection, animal disease eradication, animal inspection and quarantine, and animal disease and parasite research. The Department has specific statutory authority for the programs in which the branches are engaged. Activities carried on by the branches must be based entirely upon such authority and are likewise limited by the statutes.

MEAT INSPECTION BRANCH

The Meat Inspection Branch is charged with the responsibility for the inspection of animals and their carcasses at time of slaughter. It is also required by law that inspections be made at all stages of preparation of meat and meat food products to assure sanitary handling, wholesomeness of the product, and to prohibit adulteration. Similar responsibility is assumed for labeling and inspection of import and export meat food products. In antemortem and postmortem inspections of over 100 million animals a year, considerable information is disclosed relative to the incidence of animal diseases. This information is used in animal disease prevention, control, eradication, and research programs. But it must always be remembered that the primary responsibility of the Meat Inspection Branch, operating under the Federal Meat Inspection Act, is to satisfy the expectancy on the part of the American consumer that the meat bearing the "Inspected and Passed" stamp is clean, free from adulteration, and produced from healthy animals. The program of this branch, in discharging its responsibility, contributes to the control of animal diseases, including those transmissible to man.

ANIMAL DISEASE ERADICATION BRANCH

The disease control responsibilities, stemming from a number of statutes (the

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original one enacted in 1884 established the Bureau of Animal Industry) and subsequent acts, have been delegated to the Animal Disease Eradication Branch. They include (1) preventing the interstate spread of diseases of livestock and poultry, and (2) cooperating with the states and other agencies in the control and eradication of diseases of livestock and poultry. In recent years, this authority has been extended for cooperation with other countries, such as Mexico.

The activities of this branch, carried on in public stockyards and in work pertaining to interstate commerce and animal health regulation enforcement, are entirely under the authority of federal statutes. Disease control and eradication programs, such as those concerning bovine tuberculosis, brucellosis, and vesicular exanthema, are carried on cooperatively with the states and utilize the authority of state and federal statutes.

The federal statutes governing this work were designed to safeguard the nation's livestock. When diseases of livestock or poultry present a serious national problem, the Secretary of Agriculture is responsible for working cooperatively with the states to bring about the control and, if possible, the eradication of such diseases. These statutes have been generally interpreted to mean that such programs should be undertaken when they are necessary to safeguard the nation's livestock and poultry, or when losses from such diseases are taking, or may take, a serious economic toll from the producers and others in the livestock industry. Rabies might serve as an illustration. The Department is authorized to cooperate with the states in the prevention, control, or eradication of rabies to protect livestock and, for that purpose, to work with any species of animals that has been determined to be a means of disseminating or transmitting rabies. Rabies control programs, primarily designed to protect the health of human beings, are under the jurisdiction of public health agencies. When the two jurisdictions come together, close cooperation must result.

Similar attention has been attracted to the occasional case of anthrax in man, resulting from exposure to imported wool or hair. The potential danger of importations of this nature have been brought to the attention of the state and federal departments of agriculture mainly because of the discharges of such manufacturing plants possibly reaching livestock.

Insofar as we have been able to determine, there have been no cases of anthrax in livestock from this source. We are of the opinion, therefore, that the problem of industrial anthrax, resulting from contaminated hair or wool, is primarily a public health problem and should be dealt with by those agencies. Some years ago, when animal by-products were found to be contaminated with anthrax spores and the disease was being caused in livestock through such importations, action was taken by the U.S.D.A. to prevent such disease transmission.

ANIMAL INSPECTION AND QUARANTINE BRANCH

The Animal Inspection and Quarantine Branch is responsible for controlling the importation and exportation of animals and animal products as they pertain to livestock and poultry diseases. In order to protect this nation's livestock and poultry, regulations administered by this branch are designed to prevent the introduction or exportation of livestock and poultry diseases by (1) preventing the introduction of foreign animal diseases and (2) protecting the export market for their products.

For example, this branch does not assume the responsibility for the importation of domestic dogs, except for dogs that are to be used in handling livestock. The possible introduction of *Multiceps multiceps*, or what is commonly known as "gidworm" in sheep, through the introduction of such dogs has been determined to be a real threat to the health of sheep in the United States. Therefore, this branch administers a regulation designed to prevent the introduction of this parasite through the importation of dogs which are intended for use in handling livestock.

Another responsibility given to the Animal Inspection and Quarantine Branch pertains to the licensing and inspection of establishments producing viruses, serums, toxins, and analogous products intended for use in the treatment of domestic animals. Such products have to be prepared under regulations prescribed by the Department at establishments holding licenses for the production of such products to be eligible to move interstate. Any worthless, contaminated, dangerous, or harmful biological product can not legally be moved interstate,

nor can it be imported into the United States. Importations of biological products can be made only under permit and after they have been found not to be worthless, contaminated, dangerous, or harmful.

Under authority of the Secretary of Agriculture, the Animal Inspection and Quarantine Branch issues licenses to individual producers for the production of veterinary biological products upon meeting certain requirements, which include an outline of production and testing, with research and experimental data, proving that the product or products are not worthless, contaminated, dangerous, or harmful but will serve the purpose for which they are intended. Testing of the products is performed in the licensed establishments and, to the extent possible, in government laboratories. Since the wording of the Act refers to domestic animals, this legislative authority has been considered to apply to pets as well as food-producing and furbearing animals. Licensing authority for biological products intended for use in human beings rests with the National Institutes of Health of the Department of Health, Education and Welfare.

ANIMAL DISEASE AND PARASITE RESEARCH BRANCH

The Animal Disease and Parasite Research Branch, under authority of the Act of 1862, establishing the Department of Agriculture, and the Act of 1884, plans and organizes programs of research on diseases and parasites of livestock, poultry, and farm-raised furbearers in order to develop practical and economical control measures.

The branch conducts scientific and operating phases of research investigations, involving studies of bacterial, mycotic, viral, and noninfectious diseases of livestock and poultry. It studies chemical, toxicological, physical, serological, immunological, and pathological aspects of these diseases; the life history, ecology, morphology, and pathogenesis of parasites which are harmful to livestock and poultry; and parasitic diseases and the development of practical and economical control measures. The branch develops and improves techniques and methods for immunizing agents used for the eradication and control of livestock diseases and parasites by the regulatory branches and state agencies. It develops and maintains cooperative relationships with federal, state, and other organizations and individuals in the conduct of research of mutual interest.

Of the many livestock diseases and parasites which are transmissible to man, the branch includes in its research program those which cause losses of livestock and poultry. The branch performs research on brucellosis as a disease of cattle, swine, sheep, and goats; on leptospirosis as a disease of livestock; and on ornithosis as a disease of poultry. It also concerns itself with trichinosis and beef measles as parasites of swine and cattle. It does not perform research on these diseases as diseases of man but, rather, concerns itself with the role of man as a host of a parasite and, therefore, as a means of spreading it to animals.

CONCLUSION

It should be apparent that the basic authority and responsibility for programs relating to diseases of animals carried on by the U.S.D.A. are related to the significance of the effects of such diseases on the nation's livestock and poultry.

The public health aspects of such diseases are of great importance to this Department and every effort is made to cooperate with the health agencies in their prevention and control programs. Of course, when public health significance is added to the necessity to protect the nation's herds and flocks, our prevention, control, and eradication programs achieve a dual purpose. Public health agencies give much assistance in such programs. But it should be understood that diseases which are primarily human health problems are controlled under programs carried on under the authority of other agencies which have the responsibility of protecting human health. Of course, this does not apply to our meat inspection program, the prime responsibility of which is the protection of human health.

The U. S. Foreign Agricultural Service reports the worst epizootic of foot-and-mouth disease in Britain since 1952. Since Aug. 8, 1956, 99 herds have been affected in England and Wales. In eradicating the disease, 6,151 cattle, 2,468 hogs, 9,697 sheep, and a few goats have been slaughtered.—*Cattleman, Nov., 1956.*

The average egg production per hen in New Jersey in 1955 was 189 eggs. —*News Serv., Rutgers Univ., Oct., 1956.*

Fibular Fracture in a Filly

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A Thoroughbred filly, 2 years old, was presented for diagnosis approximately 48 hours after the onset of an acute type of lameness involving the left hindlimb. The cause of lameness appeared to be associated with her first "work" on the track. When first examined, she showed acute pain in the affected limb, with a pronounced inability to move in a normal manner. For a period of several days, she was moved only for diagnostic purposes. When in motion, early in the course of the lameness, only the toe touched the ground and she was unable to attain maximum flexion or extension of the limb. She would "back" only moderately well. Approximately three days after initial observation, an abnormal twitching was noticed in the region of the long and lateral digital extensor muscles. At this stage, the acute pain had decreased and she placed more weight on the whole foot. A provisional diagnosis of fracture of the fibula was made and was confirmed radiologically. The filly was subsequently destroyed for humane reasons, with the consent of the company with which she was insured. The fracture was demonstrated at necropsy.

This case indicates that a fracture of the fibula may cause an early acute lameness which is evident at the walk, when the horse is confined, or at a racing gait.

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Fig. 1—Radiograph of fibular fracture in the filly.

Dwarfism and Obstetrical Problems—A Case Report

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Mineral Bluff, Georgia

A dwarf Holstein-Friesian (fig. 1), about 4 years old, developed a prolapse of the vagina, cervix, and bladder near the end of her second gestation period.

The first calving had taken place normally and was followed by satisfactory lactation. The exact date of rebreeding had not been recorded.

Fig. 1—Dwarf Holstein-Friesian cow with prolapse of the vagina, cervix, and bladder. The man is about 6 ft. tall.

The prolapse followed a few hours of straining and it was assumed that she was in labor. A veterinarian was called and found the cervix closed and sealed. The prolapse was reduced and retained with

Dr. Kingman, formerly veterinarian for the Wyoming Hereford Ranch now resides in Mineral Bluff, Ga.

continuous sutures through the labia of the vulva. The owner was advised that she was not ready to calve, that he should watch for the escape of fluids and the appearance of membranes or some part of the fetus, and should then release the retention sutures. Three or four days later, she calved during the night without assistance by forcing out some of the sutures. The prolapse did not return at that time and the wounds were treated with dry dressing. However, she continued to strain and eventually the prolapse recurred.

The bladder was turned backward inside the everted vagina. The uterus had also followed the bladder into the pelvis, but had undergone sufficient involution to prevent its eversion. Since the urethra was twisted, a finger was introduced through the meatus to allow the urine to escape and the bladder to collapse. Following an epidural injection of cyclaine, no difficulty was experienced in correcting the condition. Sutures were anchored to the thick, tough skin several inches lateral to, but not through, the vulva (fig. 2). Plastic-insulated wire, No. 20 (used in blasting), was passed through the eye of a large spaying needle which was easily inserted with needle holders. After each suture was placed, the needle was released by cutting the wire, leaving two loose ends on each side for quills (or buttons).

The cow continued to strain but produced a good flow of milk. Other interesting things associated with this case are worth reporting. It affords an opportunity to examine briefly the use of the word "dwarfism." Animals that show many or even a few characteristics that are common to the general conception of dwarfism cause no confusion. However, sharp differences of opinion arise relative to how small, "chunky," and dish-faced an animal must be to be called a dwarf. In addition to the borderline cases, an animal can be quite normal in appearance (phenotypic) but still carry, in obscure places, inherited faults common to dwarfs. The character of such faults can vary from gross deformities to slight changes that are difficult to detect and interpret (fig. 3).

For example, narrowness of the pelvis can vary from large deformed ilia, which leave only a small slit for the pelvic inlet, to a slight infringement upon the passage that can cause dystocia.

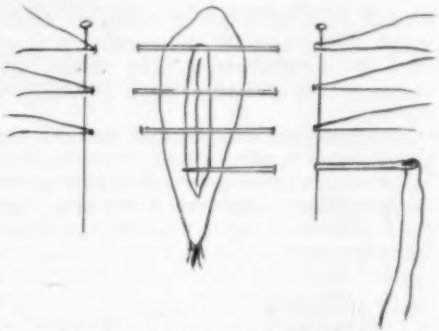

Fig. 2—Sutures anchored to the tough skin lateral to the vulva, but not through it.

Most dwarfs have large heads, especially bulging foreheads. Justifiable confusion arises relative to a diagnosis of hydrocephalus. All normal ventricles contain fluid. Just how much fluid and how much bulging is required to substantiate a diagnosis of hydrocephalus must be allowed liberal interpretation.

It is expedient to make use of such terms as dwarfism and hydrocephalus, provided one's thinking is not molded to accept generalizations, for then one soon becomes lost in the throes of minutia.

True dwarfs—small, deformed animals (genetypic)—seldom reach maturity and less frequently are they bred and give birth to offspring. However, during the last year, I have had occasion to deliver calves from 2 dwarf heifers. In 1 case, the fetus was emphysematous. In both cases, I chose to deliver the fetus by embryotomy and forced

Fig. 3—The bulging forehead and contracted tendons are characteristics of "dwarfs." Whether animals like the one shown here are related to the dwarf syndrome remains controversial.

extraction. I could not bring myself to attempt laparotomy at night on a manure pile and single-handed. The ordeal was rough on the heifers and me, but all survived.

A single case has provided material for the discussion of prolapse of the vagina, cervix, and bladder and its treatment; some of the obscure phenomena are associated with dwarfism and pregnancy in dwarf heifers.

Role of Ram in Vibriosis—An Abstract

Abortions occurred in the majority of the lots of ewes in two natural epizootics of vibriosis in flocks divided into small breeding lots. If the rams were the source of infection, the majority of them must have been infected; this was considered unlikely.

Ewes inoculated with suspensions of *Vibrio fetus* organisms, either intravenously or via the uterine os, and either two heat periods prior to breeding or at the time of breeding, did not abort or show evidence of infection, although the percentage of nonpregnant ewes was high. Ewes inseminated with suspensions of semen and *V. fetus* lambed normally. The intravenous inoculation of pregnant ewes revealed that although abortions can readily be produced in the second, third, and fourth months of pregnancy, ewes are resistant to infection during the first month.

Both field and experimental findings indicated that the ram was not the source of ewe infection. The relative ease with which abortion can be produced late in pregnancy indicates the possibility of natural infection during gestation from infected premises or some other source.—[*B. D. Firehammer, H. March, and E. A. Tunnicliff: The Role of the Ram in Ovine Vibriosis. Am. J. Vet. Res., 17, (Oct., 1956): 573-581.*]

Plastic Surgical Dressings.—Sprayable, transparent, polyvinyl plastic dressings are cheap, easily applied, bacteriostatic and bactericidal, nontoxic, and semipermeable, resulting in dry, clean wounds. Research on dogs with aeroplast showed it to be "definitely superior to ordinary gauze and adhesive dressings." Spraying a segment of the intestine resulted in dense adhesions from the intense local foreign body reaction. When it was sprayed on sterile water and the resulting sheet was sutured between the peritoneum and the omentum, it was completely incased in fibrous tissue two months later, suggesting its value in the repair of hernias. Further research is necessary.—*Am. J. Surg., Oct., 1956.*

Progesterone in Animal Placentas

Since progesterone has been isolated from the human placenta, it is assumed responsible for preventing abortion when the ovaries are removed during pregnancy. The ovaries have also been removed from mares, cows, ewes, and bitches during pregnancy without inducing abortion.

By chemical means, a substance identical with progesterone was detected in the placenta of a mare but not in late-term placentas of the cow, ewe, sow, or bitch. However, injection of the extracts of cow placenta into a rabbit produced an endometrial response similar to that of progesterone, and the blood levels of "progestin" continued to rise throughout pregnancy when the ovaries of a ewe were removed.—*Nature, Oct. 6, 1956.*

The Burst Abdomen.—Dehiscence occurred in 2.1 per cent of all laparotomies, in a hospital in Britain, when appendectomies were excluded. The wound usually opened on the fifth or sixth postoperative day—most frequently those in the upper abdomen. Some, in debilitated patients, showed no signs of healing, but the more important type was in patients in good condition, usually in older persons, and were preceded by a serosanguineous discharge from the wound. Asepsis, but not the type of suture material, seemed to be a factor since the incidence was less when antibiotics had been used.—*J.Am.M.A., Sept. 15, 1956.*

Bovine Twins and Triplets.—About 91 per cent of heifers which are twins with bulls are freemartins. One cow had two pairs of mixed twins and both heifers bred normally. A Brown Swiss cow had triplets, a bull from one ovum and identical freemartin twin heifers from the other ovum. Twinning is inherited. A bull was credited with siring twins until it was learned that the dams of the twins had inherited the tendency from their sire, the previous herd bull.—*Hoard's Dairyman, Nov. 10, 1956.*

Anthelmintics in the Control of Parasitisms of Farm Animals

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THE DISCUSSION of anthelmintics will be restricted to those chemotherapeutic agents used for the purpose of removing gastrointestinal parasites from farm animals. An ideal anthelmintic has been defined[1] as one possessing the following properties: effectiveness in removing the parasite from the body or the host with, preferably, a single dose; wide therapeutic ratio; low cost; and ease of administration. Other highly desirable qualities would include a wide range of effectiveness against several species of parasites and that it be palatable or, at least, not markedly distasteful.

As yet, we have no anthelmintic that possesses all of these qualities. As a group, anthelmintics are essentially toxic and dangerous drugs. An anthelmintic will neither prevent an animal from picking up further infection, if it is maintained under unsanitary conditions, nor will it repair damage already done. Anthelmintics are selective in action[2]; their dependable effectiveness is, in most instances, limited to one species or a group of related species or genera. For example, a certain drug may be effective against ascarids but not tapeworms, or against hookworms but not whipworms. The larger worms usually are more easily removed than are the smaller species, and adults usually are removed more effectively than are immature stages,[2] possibly because smaller worms may be protected by mucus or by being closely adherent to the mucosa. Many larvae and some adults are actually in the mucosa and, thus, do not come in contact with the effects of the anthelmintic.

The anatomical peculiarities of the host may also influence the effectiveness of a given drug, e.g., several drugs that give good results in nonruminants apparently are diluted by rumen contents to such an extent that they become ineffective. Many differences exist in the tolerance of the host animals to certain drugs, e.g., sodium fluoride may be employed as an ascaricide in swine but may prove toxic to other animals. Also, phenothiazine is safe in sheep, while horses have been poisoned with amounts as little as 60 Gm.[3] Goats apparently are more susceptible to the effects of nicotine than are sheep.[4] Although oil of chenopodium is a fairly effective ascaricide in dogs, swine, and man, it is of little or no value in removing ascarids from horses. Such species differences are apparently physiological but are difficult to explain.

A most important factor, often not receiving the consideration it deserves, is that animals showing clinical evidence of parasitism are sick animals and toxicity may result from administration of drugs that cause no apparent ill-effects in apparently normal individuals. In 1911, it was emphasized[5] that care should be taken in treating animals that are visibly ill. Often, divided doses should be given, rather than the single recommended therapeutic dose. The contraindications include fever, cachectic conditions, extreme youth, extreme old age, and advanced pregnancy. For example, although apparently healthy sheep have been given 277.5 Gm. of phenothiazine with no signs of toxicity, abortion has been reported as occurring in ewes receiving a 25-Gm. dose of phenothiazine during the last 30 days of the gestation period.[6] If the best results are to be obtained from anthelmintics, every effort should be made to treat animals before clinical signs of parasitism occur. Sanitation, good nursing, and an adequate level of nutrition must be maintained. An anthelmintic can aid in, but can not adequately control, parasitism.

PIPERAZINE AS AN ANTHELMINTIC

There have been many reports on the effectiveness of the various piperazine salts within the last few months. We have found piperazine citrate solution®* an effective ascaricide in poultry when given at the rate of 8,000 mg. per gallon of drinking water. It is primarily of value against ascarids and is, apparently, nontoxic at therapeutic levels. Parvex®† also gave excellent results.

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*Produced by E. R. Squibb and Sons, Brooklyn, N.Y.

†Piperazine-1-carbodithioic betaine, produced by the Upjohn Co., Kalamazoo, Mich.

In horses, piperazine salts appear to be the most effective and safest ascaricides to date.

Piperazine adipate was reported[9] to be an effective ascaricide. It is well tolerated by the horse. Doses of 220 to 1,500 mg. per kilogram of body weight produced only slight laxative effects at the higher levels. After piperazine adipate was given to 520 foals, yearlings, and mature horses, it was concluded[10] that it was a safe and effective ascaricide and, when combined with phenothiazine, fulfilled the requirements of an anthelmintic.

Piperazine salts have been studied by a number of investigators in the removal of ascarids from swine. They were found[11] to be equal in efficacy, but seven to 12 times as costly per treatment, as sodium fluoride. When piperazine hexahydrate and piperazine sulfate were given to swine, an average dose of 48.6 mg. of anhydrous piperazine per pound of body weight was 96.9 per cent effective for the removal of 916 *Ascaris lumbricoides* from 42 animals.[12] Both piperazine drugs were administered in water and appeared equally acceptable to swine.

At this Station, we found that parvex was accepted readily by swine. When compared with sodium fluoride in the reversal-type tests,[13] it proved equally effective in removing ascarids from young pigs.

Piperazine was reported[7] to be of little value against the stomach worm *Haemonchus contortus* in sheep, but it did remove Oesophagostomum. Sheep were given up to eight times the generally recommended dose of 220 mg. per kilogram of body weight. No evidence of toxicity was observed, nor was there any evidence of anthelmintic activity against the members of the family Trichostrongylidae. Eight calves naturally infected with trichostrongylids received piperazine citrate solution, and 2 were given four times the recommended dose, without evidence of anthelmintic activity. Similar negative results were obtained with parvex and piperazine dihydrochloride.

Piperazine adipate was reported[8] to be effective for cattle ascarids. However, since ascarid infection in cattle is limited to only a few areas in the southern part of the United States, we have had no opportunity to observe the effectiveness of the drug in cattle.

In reviewing the action of piperazine salts in domestic animals, we feel that they are primarily of value as ascaricides in horses, swine, and poultry.

Phenothiazine remains the drug of choice for Strongylidae of horses. A therapeutic dose of 25 Gm. followed by a 2-Gm. daily intake is probably the most rational approach to this problem. The therapeutic dose may be given simultaneously with piperazine.[10]

Many favorable reports have been published on the use of phenothiazine in therapeutic and daily low level intake in both sheep and cattle. Sheep accept phenothiazine readily (more so than cattle) and low level phenothiazine feeding is undoubtedly of value in many areas. However, this has not been found true in range cattle in the deep South. After a year of experimental feeding of low level phenothiazine, it was concluded[14] that such practice was not economical under Florida conditions. Also, in Texas,[15] unweaned calves harboring a light parasite load showed no differences in weight gains between phenothiazine-treated and untreated control animals. When several different phenothiazine mineral mixes for cattle were tested,[16] none was consumed free choice in sufficient amounts to give effective control of the worm parasites of cattle in the Gulf Coast area.

It is recommended that when phenothiazine is employed as an anthelmintic in range cattle, a therapeutic dose be given. Low level phenothiazine may be made available (free choice) but, in many instances, it may be of little value. The mere presence of the drug in a salt box or mineral mixture too often gives the owner the idea that no other care is required, an idea which, unfortunately, is strengthened by some of the inaccurate and misleading advertisements that appear in farm publications. As so aptly stated by Foster,[17] ".... the virtues of phenothiazine have lulled us into a position of false security. This drug does not remove or control all worms and it is therapeutically ineffective in animals whose digestive function is seriously impaired. It is little wonder that there is concern over practical failures of phenothiazine when one considers the wide and almost exclusive reliance on it as a panacea for all gastrointestinal parasitism." Foster also pointed out that, "There are no treatments of any kind against some 90 of about 145 species of helminths that are of more or less economic importance in food animals."

In conclusion, it must be emphasized that control of parasitisms in farm animals does not merely consist of administering a suitable drug. Often, changes in management practices and nutrition will prove more valuable than will the anthelmintic. Parasitisms in human beings are not controlled by drugs but by ever-increasing levels of personal sanitation.

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[Practitioners should study the above article. With depressed agricultural prices, drug costs are important. Sodium fluoride can be dispensed, after being premixed with a mineral concentrate, so it will mix uniformly in ground feed, moistened or dry.—W.A.A.]

Treatment of Tapeworms in Poultry.—When at least 50,000 chickens were treated with tablets containing hexachlorophene (50 mg.), phenothiazine (500 mg.), and nicotine (50 mg.), 60 to 100 per cent were freed from tapeworms. The treatment depressed egg production and, in one case, resulted in a severe mortality among birds affected with blackhead.—*Vet. Bull., Oct., 1956.*

Chronic Respiratory Disease.—CRD, the No. 1 disease of broilers in the United States, is caused primarily by pleuropneumonia-like organisms, but *Escherichia coli* and yeasts are also etiological factors. PPLO are present in a large percentage of eggs from infected hens but most of these eggs do not hatch. The incubation period for the disease is seven to 68 days and the mortality is 8 to 50 per cent, but the greatest loss is from retarded growth. Antibiotic therapy is sometimes beneficial but, on the average, may not justify the cost. No treatment can replace good feeding and husbandry practices.—*Agric. Res., Oct., 1956.*

Mortality from cecal coccidiosis, in experimentally infected chicks, was prevented by adding aureomycin® (100 Gm./ton) and sulfamethazine (2.5 lb./ton) to the feed.—*News Serv., Rutgers Univ., Oct., 1956.*

Coccidioidomycosis caused the death of an infant, 21 days old, in Chicago after an eight-day illness. The only lesions found were multiple nodules in the lung. The most likely source of infection was from the mother who had a typical lesion (granuloma) removed from her right foot, in 1954, in Mexico.—*J.Am.M.A., Oct. 27, 1956.*

Hamsters have been found to be susceptible to the common cold of man, the only animal, other than the chimpanzee, susceptible to this virus. Suckling hamsters exposed nasally developed typical signs in three to seven days and, after recovery, were resistant to a second exposure.—*Science, Nov. 2, 1956.*

Clinical Experience with Tranquilizing Agents

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Miami, Florida

TRANQUILIZING agents are sometimes called "happy pills" or "don't give a darn pills." Actually, these are apt names because that is about the condition that these drugs produce. For clarity, the drugs may be divided into three groups, according to their indicated use. Each group varies from the others, but all have certain characteristics in common.

These are useful drugs. They are, in effect, chemical restraining agents and are more gentle, humane, and pleasant to use than physical restraint. They are quite safe, even when tested with several doses per day over a period of time much longer than most veterinarians would wish to use them.

Clients are pleased with their effects. We have experimented with a few of our clients to see what their response would be. For example, we would take an animal with chronic otitis and treat it once or twice under the influence of a tranquilizing agent then, without comment, would withhold the drug during the next treatment. The owners usually have indicated that they preferred to have the tranquilizer used; the dog was more quiet, shook his head less after treatment, and was more peaceful when taken home.

These drugs act to produce a sense of euphoria in the recipient—the animal just "doesn't give a darn." They will respond normally to stimuli of hunger and thirst and the necessity for elimination. Animals are more cooperative when tranquilized, they do not seem to have as much will of their own.

There are many tranquilizing drugs now and new ones are being produced almost daily. To date, we have been using those produced for use in man but the first one intended for veterinary use exclusively, pacital,* has recently been announced. It can be injected or given in tablets. We have used it a few times with promising results.

MEPROBAMATE DRUGS

We will first discuss the meprobamate group, which are known by the trade name of equanil† and miltown.‡ These drugs have fewer side effects than the others and, therefore, would be considered safest, certainly the safest for constant use. One of their prime advantages is that they cause no alteration of the autonomic nervous system and, therefore, digestion, perspiration, and other normal body functions are unaffected.

Some veterinarians have reported trouble with diarrhea with certain tranquilizers. This would not be anticipated with a drug that does not alter the autonomic nervous system. Another advantage is that meprobamate has no synergism, so it can be given continuously without effect on the action of other drugs that it may be necessary to use.

One limiting factor in the use of this group of drugs is that they are only slightly soluble so they must be given orally, and there is a time lag of about an hour from the time of administration until the drug is fully effective. We find it effective in a fretting hospital patient—the dog that whines and barks when confined. By giving an adequate dose two or, if necessary, three times a day, the dog becomes relaxed, more cooperative, and seems not to mind confinement. The animal shows no sign of ataxia and the owner does not notice the effect.

If we anticipate that the animal will be returned for further treatment, either a nervous dog or one that may need some uncomfortable treatment, we dispense the pills with instructions to give the medicine an hour prior to the appointment. The drug has usually taken effect by the time we see the animal. These drugs are also of benefit for car sickness and many minor conditions such as fear of thunder and lightning. We also dispense them for animals that have a tendency to molest stitches or irritating bandages.

Dr. Knowles is a small animal practitioner in Miami, Fla.

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*Warner-Chilcott Laboratories, Morris Plains, N.J.

†Wyeth Laboratories, Philadelphia, Pa.

‡Wallace and Tiernan, Inc., Belleville, N.J.

CHLORPROMAZINE AND PROMAZINE

The second group, chlorpromazine§ and promazine,‖ are phenylthiozine derivatives. Promazine is less depressing than chlorpromazine, the one that we usually use. These are a little more depressing than the meprobamate drugs; therefore, we have used them in the hospital almost exclusively. We do not dispense them. Their big advantage is that they can be administered by any route—intravenous, subcutaneous, intramuscular, or *per os*. We usually use them for injections only, because we like the meprobamate drugs for oral administrations.

When a dangerous dog is brought to us, we have the owner hold it against a wall while we inject an adequate dose of the drug into the hip muscles. In about 15 minutes the dog is docile and can be handled. If a dog becomes refractory, tense, or nervous during a procedure such as cleaning its teeth, we give it an intravenous injection, then wait about five minutes. It is then much more cooperative.

We also use these drugs where an unusual amount of cooperation is required, such as for x-ray therapy. The dog will usually lie quietly for the four or five minutes required for treatment. This is better than giving an anesthetic every three or four days, especially since many such patients are old dogs.

The tranquilizing drugs in this group are quite effective as preanesthetic agents. They do not cause a stage of excitation and, therefore, they complement barbiturate anesthesia. Their use can reduce the amount of anesthetic required by about 50 per cent. We like them better than morphine because the animal is less affected mentally after recovery from the anesthesia.

ANTICONVULSANT DRUGS

A third group of drugs are actually anticonvulsants. Whereas the first two groups are tranquilizers which have some anticonvulsant action, these are anticonvulsants that have some tranquilizing properties. Phenocitamide, or phenurone,** has been available for some time; it is used for convulsions of the *grand mal* type in man. We have used it to control convulsions, with only slight interference with normal functions. A heavy dose may cause some ataxia but the animal can eat, can still maintain house manners, and its ambulation is adequate.

We have used this drug in two types of conditions: in dogs that have had more than one fit, and in dogs in which convulsions are anticipated. It will control all but the most severe convulsions. We have used it experimentally in cases that were obviously hopeless and, while some of these dogs have died, they did so without convulsions. At least the convulsions became so mild that it was difficult to recognize them. The second use has been in cases where from past experience convulsions were anticipated. For example, we have learned that after the dog with hard pad has had a temperature a little over 102 F., congested eyes, and a thick nasal discharge for two or three weeks, it will often develop convulsions regardless of the treatment; also, no therapy will break that fever. Such dogs are given an adequate dose of phenocitamide for many weeks, or even months. Some of these dogs have died, but not in convulsions, while several have recovered.

There have been reports on the use of phenocitamide that are more optimistic than ours. However, all of us have used it on a fairly limited number of patients and, therefore, we can only say that the results are encouraging and interesting. In another year we should have reports on a sufficient number of cases to be able to draw some conclusions. This looks like a useful tool in the management of an extremely discouraging condition.

None of these drugs are, of course, going to replace kindness. They simply will serve to augment kindness and will permit us to extend a gentle treatment to animals which, by their temperament, have in the past been a problem. Perhaps the best way to describe the benefit from these drugs is to state that their use can replace physical restraint with "chemical restraint."

§Thorazine, Smith, Kline and French, Philadelphia, Pa.
‖Wyeth Laboratories, Philadelphia, Pa.
**Abbott, North Chicago, Ill.

Meprobamate (Miltown) May Be Habit Forming.—A physician reports that 13 of 600 patients for whom he prescribed meprobamate developed "nervousness and jitters" when the usual dose was missed, and one developed a convulsion ten hours after discontinuing medication. However, he still regards it as the most helpful and least harmful of the tranquilizing drugs.—*J.Am.M.A., Nov. 10, 1956.*

Symposium on Poisoning—Part I

At the fifth annual seminar of the American College of Veterinary Pathologists, held in Chicago on Nov. 26, 1956, the following cases of poisoning in animals were discussed. Further reports presented at the seminar will be published in a later issue of the JOURNAL.

CASE 1—SALT POISONING IN SWINE—*J. H. Sautter, D.V.M., Ph.D.; D. K. Sorenson, D.V.M., Ph.D.; J. J. Clark, D.V.M.*

History.—Four pigs from a herd of 25, aged 4 to 6 months and in a good state of nutrition, were submitted for treatment. Six days prior to the illness, the owner started the daily feeding of two handfuls of loose trace-mineralized salt in 30 gal. of water. The animals formerly had free access to block salt. When 1 pig was found dead, a search showed 5 others noticeably sick. Of these pigs, 4 were brought to the clinic showing champing jaws, frothing at the mouth, and convulsive seizures which recurred every two or three hours. After a seizure, a pig would lie in a coma for a short time, then get up and wander around. Temperatures were normal. All had impaired vision, and examination with an ophthalmoscope showed congestion of the retinal vessels and edema of the optic disc.

Hemograms were normal as were the blood levels of calcium, phosphorus, chlorides, and sugar. Two of the pigs had a marked acidosis of the blood (36.2 and 27.7 volumes per 100 cc.).

Shortly after admittance, 2 pigs were unable to rise. One was selected for necropsy; the other was treated but failed to respond. It lived 15 days, recumbent and showing periodic paddling movements. After a few days, the convulsions ceased in the remaining 2 pigs, but 1 died in spite of treatment. The other pig at first was depressed,

Case 1 was presented by Dr. J. H. Sautter, School of Veterinary Medicine, University of Minnesota, St. Paul.

Fig. 1—Longitudinal section of blood vessel of brain of a pig (case 1). The dark cells are eosinophils; the arrows point to vacuoles. H & E stain; x 1,000.

walked in circles, and bumped into objects, then it gradually recovered in 15 days.

No gross changes were found in the tissues of the pigs that died.

Comments (Moderator, Dr. Hilton A. Smith).—We will call on the man who presented this case to discuss it, Dr. J. H. Sautter.

Dr. Sautter (Minn.).—The section of brain tissue is uniformly congested, with the major vessels showing a thick cuff of leukocytes, most of which are eosinophils (fig. 1). The endothelial cells of the vessels are increased in size and number (fig. 1). There is also rather extensive vacuolization discretely distributed throughout the gray and white matter. The lumens of smaller vessels (not shown in the picture) are almost closed by swollen endothelial cells. Neuronal degeneration is extensive and neuronophagia is observed. Edema is present in the Virchow-Robin spaces and glial proliferation elsewhere is slight. Sections of the lungs show small numbers of eosinophils around the small bronchi. The kidney tubular epithelium is fragmented and sometimes lost and atrophic. Numerous hyaline tubular casts are present.

Diagnosis.—Eosinophilic encephalitis in a pig as a result of salt (NaCl) poisoning.

Discussion.—(Dr. C. C. Morrill, Mich.).—Smartweed poisoning causes the same lesions (eosinophilic encephalitis) in swine as does salt poisoning.

Dr. D. P. Sasmore (Md.).—Was there an increase in cerebrospinal fluid pressure in these pigs?

Dr. Sautter.—The spinal fluid pressure was not measured.

Dr. D. L. T. Smith (Ont.).—In our experience with sodium ion poisoning produced by adding sodium chloride or sodium proprionate to the ration, lesions were found only in the cerebral cortex. All other organs of the body were unaffected. The sodium accumulates in the cortex of the brain and severe edema occurs after the pigs drink a quantity of water. In iso-allergic encephalitis, there is no infiltration of eosinophils. Cells, almost exclusively eosinophils, are present in the cortex 24 hours after the ingestion of the sodium. In seven to ten days the eosinophils are replaced by mononuclear cells.

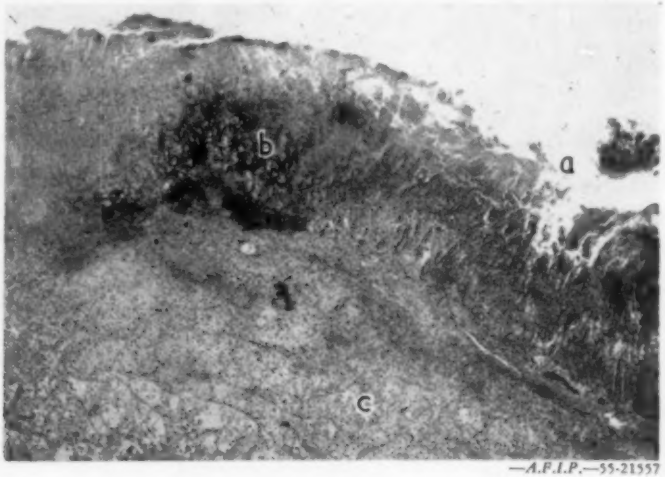
Dr. D. L. Coffin (Mass.).—In an incident of salt poisoning in a herd of garbage-fed pigs, the offending agent was saltine crackers. Due to freezing weather, no water was available to the herd and when the signs of intoxication appeared; treatment with intraperitoneal dextrose solution, 5 per cent, proved beneficial.

Dr. D. L. T. Smith.—The lethal dose of NaCl for a pig, when given by stomach tube after a fill of ground feed, is 2.2 Gm. per kilogram of body weight. Pigs survive a lesser dose.

CASE 2—ACUTE COPPER SULFATE POISONING IN FEEDER LAMBS—*L. B. Sholl, D.V.M.*

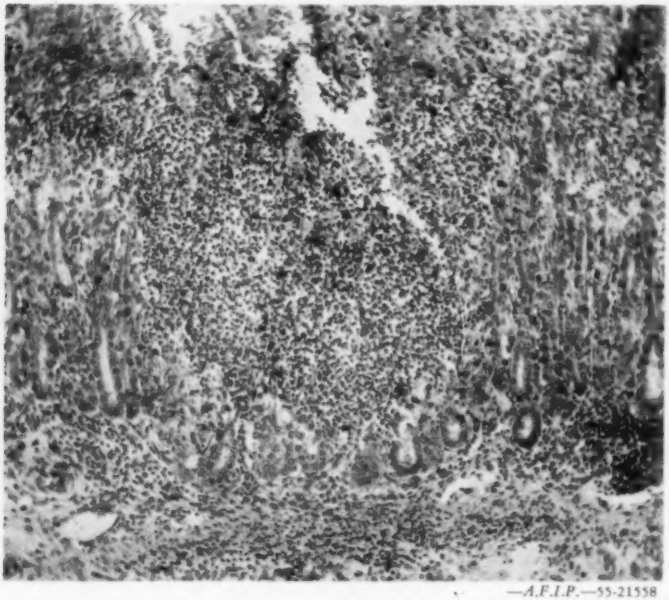
History.—Lambs which were being fattened on grain and silage were treated for internal parasites by giving each 3 oz. of copper sulfate solution (1%). The following day, several lambs showed signs of abdominal pain, vomition, and purgation. After five days, 1 lamb near death was

Case 2 was presented by Dr. L. B. Sholl, College of Veterinary Medicine, Michigan State University, East Lansing.



—A.F.I.P.—55-21557

Fig. 2—A cross section of the abomasum of the lamb (case 2) showing (a) necrosis of the mucosa, (b) hemorrhage, (c) edema, and neutrophilic infiltration into the submucosa. H & E stain; x 35.



—*A.F.I.P.*—55-21558

Fig. 3—A cross section of the glandular mucosa of the abomasum of the lamb (case 2) showing necrosis of the outer portion and some of the glands. In the deeper tissues, there is marked neutrophilic infiltration into the glandular and submucosal layers. H & E stain; x 110.

killed for necropsy. There were areas of intense inflammation of the stomach, particularly in the abomasum, and of the small intestine, as well as dull pale areas on the surfaces of the liver, kidneys, and heart. A review of the treatment indicated an error had been made in preparing the copper sulfate solution and that the lambs actually received a 10 per cent instead of a 1 per cent solution.

Comments (Moderator Smith).—The section includes a cross section of abomasum which shows marked necrosis of the mucosa and submucosa. There is marked hemorrhage, edema, and neutrophilic infiltration present in both the mucosal and submucosal regions (fig. 2, 3).

Diagnosis.—Acute necrosis of the gastrointestinal tract, particularly the abomasum, in a lamb due to copper sulfate intoxication.

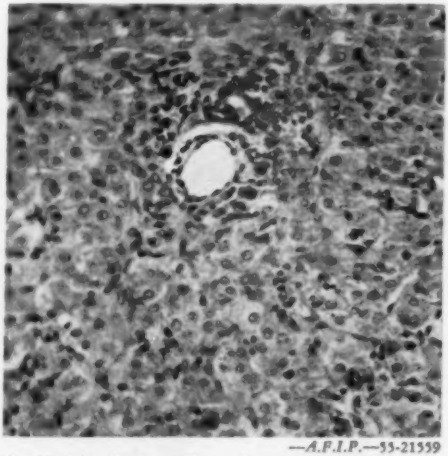
Discussion (Lt. Col. T. C. Jones, Washington, D.C.).—I get the impression that this lesion is an infarct.

Dr. C. L. Davis (Washington D.C.).—We have seen lambs affected with chronic copper sulfate poisoning as the result of drinking from ponds sprayed with copper sulfate solution. These animals develop icterus, pulpy spleens, congestion of the kidneys and livers, and their urine becomes port wine color.

CASE 3—CHRONIC COPPER POISONING IN YOUNG LAMBS—*P. C. Kennedy, D.V.M., Ph.D.*

History.—Two lambs, 2 months old, that had just died were brought in for necropsy,

Case 3 was presented by Dr. P. C. Kennedy, School of Veterinary Medicine, University of California, Davis.



—*A.F.I.P.*—55-21559

Fig. 4—The darker cells in this section of liver of a lamb (case 3) are largely pigment-laden Kupffer cells. There is also some increased cellularity around the portal vein. x 210.

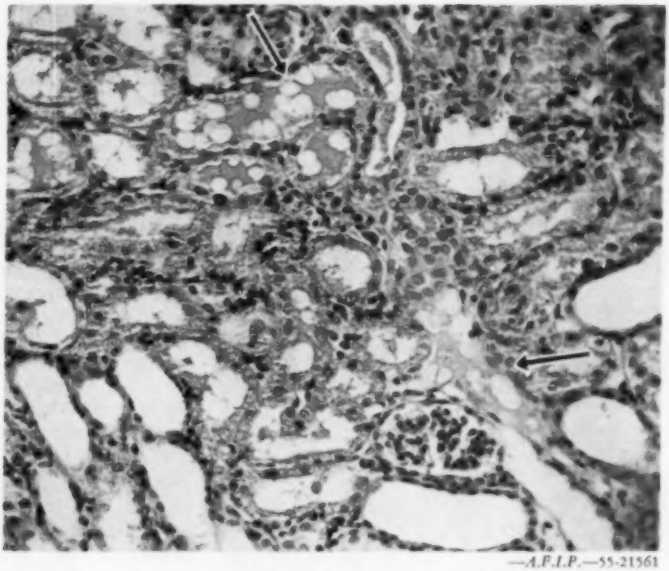


Fig. 5—Cortical area of kidney of a lamb (case 3) showing protein leakage (arrows) into the tubules. x 210.

—A.F.I.P.—55-21561

and sections of liver and kidney were saved. The owner raises orphan lambs which he obtains from the neighboring sheep ranches. During the previous month, he had lost 23 of 53 lambs, most of them 2 months old. They were fed on a commercial milk substitute recommended for calves. Those that died had refused feed and drank excessive amounts of water for two weeks. Several showed icterus and 2 had red urine. At necropsy, there was severe icterus, the kidneys were dark brown, and the spleens were slightly enlarged. The copper levels of 1 lamb were: 77 mg./100 Gm. of liver; 7.7 mg./100 Gm. of kidney; and 25 mg. per liter of urine. The levels of the other lamb were slightly higher, 121.0 mg./100 Gm. of liver and 19.5 mg./100 Gm. of kidney (fig. 4, 5, 6).

Comments (Moderator Smith).—The presence of over 500 p.p.m. of copper in the liver indicates copper poisoning.

Diagnosis.—Chronic copper poisoning in lambs.

Discussion (Dr. P. C. Kennedy Calif.).—The manner in which the copper was introduced into the milk substitute is not known. It was probably accidental since varying amounts of copper are sometimes incorporated into feeds as an internal parasiticide.

Dr. L. Z. Saunders (N. Y.).—Copper poisoning may be prevented if molybdenum is included in the ration.

Lt. Col. T. C. Jones (Washington D.C.).—Chronic copper poisoning resembles enzootic icterus often seen in animals after shipment. The in-

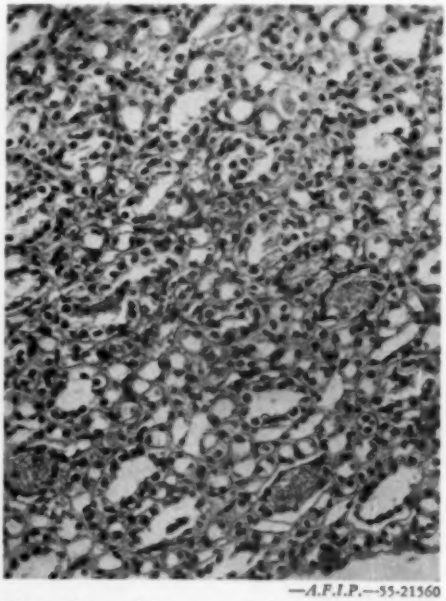


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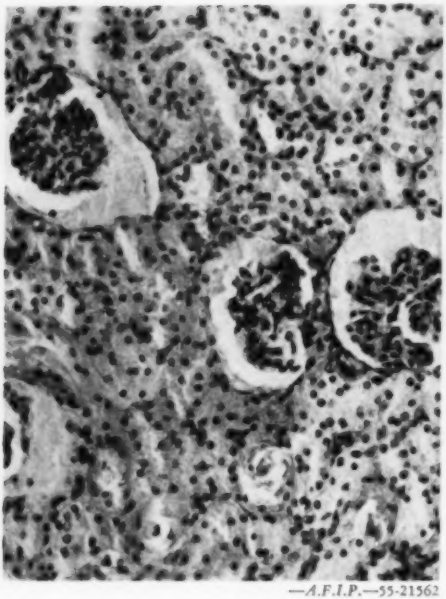
Fig. 6—The medullary area of the kidney of a lamb (case 3) showing the granular consistency of the pigmented casts. x 210.



—A.F.I.P.—55-21562

Fig. 7—Kidney of a chinchilla (case 4) with mercury poisoning. The glomerular capsules are dilated with protein precipitate. The tufts are shrunken and anemic. H & E stain; x 210.

creased copper in the liver in enzootic icterus is caused by hemolysis.

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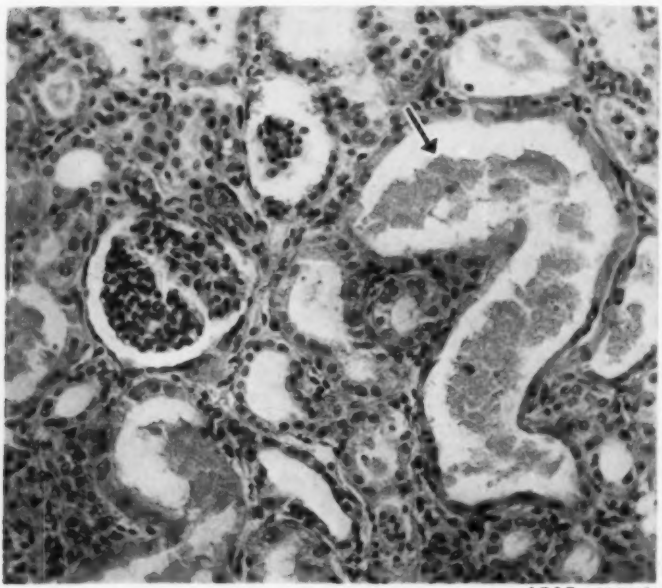
CASE 4—MERCURY POISONING IN CHINCHILLAS—*Erwin Jungherr, Vet. Dipl., D.M.V.*

History.—In a herd of 130 chinchillas, 3 adults showed signs of anorexia, drowsiness and polydipsia, and died within 24 hours. The temperatures were subnormal at the time of death. Their ration consisted of hay and grain containing leftover seed corn. At necropsy, the livers showed fatty metamorphosis, and petechiae were present on the gastric mucosa.

Comments (Dr. Erwin Jungherr).—Histological sections of the kidneys reveal nephrosis and in many of the glomeruli the capsules are dilated, the tufts shrunken and devoid of blood cells. The Bowman's spaces are filled with protein precipitate. The straight and distal convoluted tubules show cloudy swelling, with granular acidophilic staining casts in the lumen (fig. 7). In

Case 4 was presented by Dr. Edwin Jungherr, Department of Veterinary Science, University of Connecticut, Storrs.



—A.F.I.P.—55-21563

Fig. 8—Section of porcine kidney (case 5) showing necrosis of the proximal convoluted tubules. Notice the precipitated protein material present in the dilated tubules (arrow). H & E stain; x 210.

such cases, there is a relatively low degree of renal regression. The spleen was congested. Spectrographic examination of the liver disclosed 10 p.p.m. of mercury. The source of mercury was thought to be from treated seed corn.

Diagnosis.—Mercury poisoning in chinchillas.

Discussion (Dr. C. C. Morrill, Mich.).—Similar lesions have been produced in rabbits by feeding mercury-treated corn. In another case, I had trouble demonstrating mercury in tissues from cows that died following the ingestion of mercury-treated corn.

CASE 5—MERCURY POISONING IN A PIG—*Kenneth McEntee, D.V.M.*

History.—A male Yorkshire pig, 4 months old, was fed a grain ration containing 75 per cent oats. For ten weeks, the oats in the ration was leftover seed oats, treated previously with a fungicide containing mercury. The pig became sick, vomited, and was paralized in the front legs. It pushed itself around with its hindlegs, and would drink but refused to eat.

Comments (Dr. C. G. Rickard, N. Y.).—The section of the kidney shows necrosis of the proximal convoluted tubules. The casts in the tubules are the result of damage to the structure which allowed leakage of protein into the glomeruli (fig. 8). Some of the tubules have regenerated.

Diagnosis.—Degenerative changes in the kidney of a pig due to mercury poisoning.

CASE 6—ARSENIC POISONING IN A CALF—*H. R. Seibold, V.M.D.*

History.—Cattle which grazed in a pasture contaminated with insect spray containing calcium arsenate were removed when a case of poisoning was discovered. Eleven days later, a calf, 6 months old, showed signs of nervousness, nasal discharge, generalized weakness, and diarrhea. Death occurred shortly and necropsy disclosed large ulcers in the mucosa of the pharynx and larynx. The contents of the intestinal tract were fluid throughout and ulcers were found in the posterior third of the small intestine. The liver was yellowish. Microscopically, focal necrosis in the liver and degenerative changes in the renal tubular epithelium were demonstrated (fig. 9, 10).

Comments (Moderator Smith).—I am familiar with lead arsenate poisoning in sheep. The acuteness of the illness depends

Case 5 was presented by Dr. Kenneth McEntee, New York State Veterinary College, Cornell University, Ithaca, and was published in Cornell Veterinarian, 40, (1950): 143-147.

Case 6 was presented by Dr. H. R. Seibold, School of Veterinary Medicine, Alabama Polytechnic Institute, Auburn.

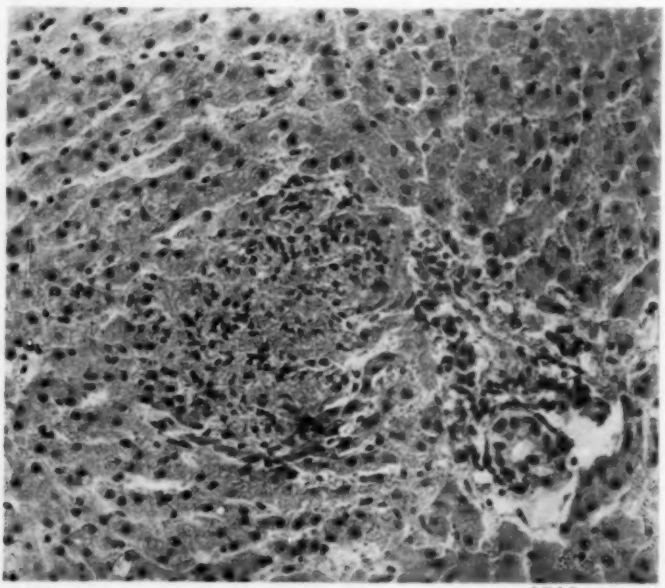
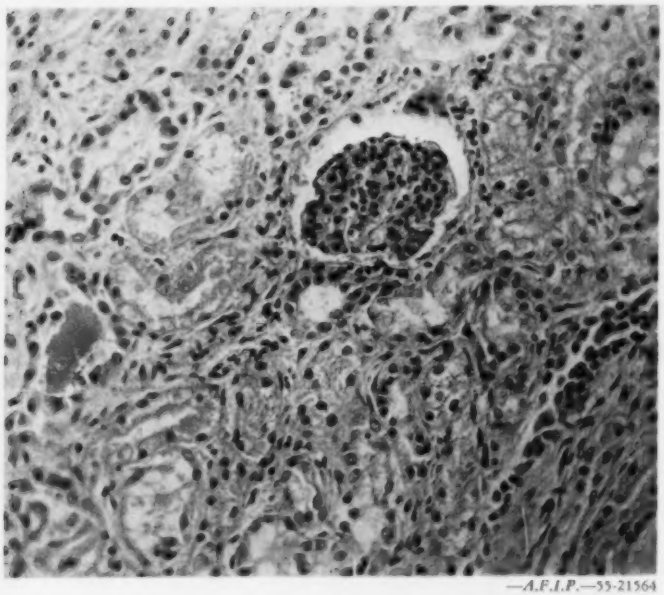


Fig. 9—A histological section of bovine liver (case 6) showing an area of necrosis. Notice the mononuclear cells invading the necrotic area that is surrounded by erythrocytes which fill the spaces between the hepatic cells. H & E stain; x 210.

—*A.F.I.P.*—55-21565



—A.F.I.P.—55-21564

Fig. 10—A histological section of bovine kidney (case 6) showing degeneration. This is characterized by an accumulation of coagulated protein in the tubules, and degeneration of some of the epithelial cells of the tubules. H & E stain; x 210.

upon the quantity of arsenic ingested. Death may occur in 24 hours or the animals may be ill for many days. At necropsy, they show severe ulcerative gastroenteritis and fatty degeneration of the liver.

Diagnosis.—Arsenic poisoning in a calf.

Discussion (Dr. H. R. Seibold, Ala.).—This case is of unusual interest because, in addition to being a proved case of arsenic poisoning, there were small areas of necrosis in some of the mesenteric lymph nodes from which *Listeria monocytogenes* were recovered. Mentioning this only adds to the confusion in the case. The brain contained no histological evidence of listeriosis and the animal certainly died of arsenic poisoning.

Sallman's textbook on pharmacology contains an excellent description of the mode of action of this drug, particularly on the capillary walls. I have not seen an article that gives an adequate histological description of arsenic poisoning in cattle.

CASE 7—SULFONAMIDE INTOXICATION IN A STEER—*J. H. Sautter, D.V.M., Ph.D., and H. H. Hoyt, D.V.M., Ph.D.*

History.—A 350-lb. Aberdeen Angus steer, 1 of a herd purchased three weeks earlier, was brought to the clinic because of a respiratory infection. Four others were similarly ill but they had responded to sulfadiazine therapy. This steer continued to cough and to show excessive lacrimation, partial anorexia, a temperature of 104 to 107 F. It had been given 480 gr. of sulfadiazine daily for four days but the anorexia and fever continued. The calf was weak, staggering, and in a critical condition. Treatment was changed to penicillin therapy and glucose solution, intravenously. A urine sample was light yellow and showed a specific gravity of 1.01 and 3-plus albumin. Microscopically, the sample contained numerous epithelial cells and sulfonamide crystals. The latter suggested a diagnosis of sulfonamide intoxication, probably due to mechanical blocking of the kidney tubules. Death occurred ten hours later.

At necropsy, the apical lobe of the right lung was consolidated and adhered to the thoracic wall. The remainder of the right lung showed a lobular distribution of consolidation and hyperemia. Petechiae were noted on the epicardium and endocardium.

The capsules of the kidneys stripped with ease, revealing a clay-colored surface mottled with red. The cut surface showed numerous irregular-shaped, chalky sulfonamide granules in both the major and minor calyces. The cortex showed red and white streaks (fig. 11) and hemorrhages were noted in the pelvis.

The bladder contained light yellow-col-

Case 7 was presented by Dr. J. H. Sautter, School of Veterinary Medicine, University of Minnesota, St. Paul.

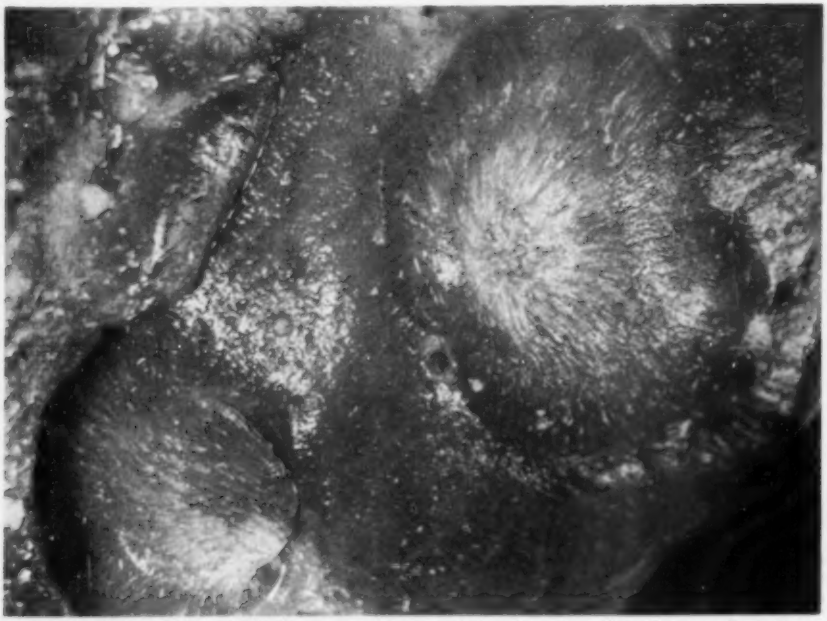


Fig. 11—White streaks of sulfadiazine are shown in tubules of renal papillae of a steer (case 7).

ored urine and several grams of white sediment which was identified as sulfonamide.

Comment (Dr. J. H. Sautter).—Microscopically, the kidney shows many tubules containing sulfonamide crystals (fig. 12). The tubular epithelium shows hydropic degeneration and cloudy swelling. In many other places, the tubular epithelial cells ap-

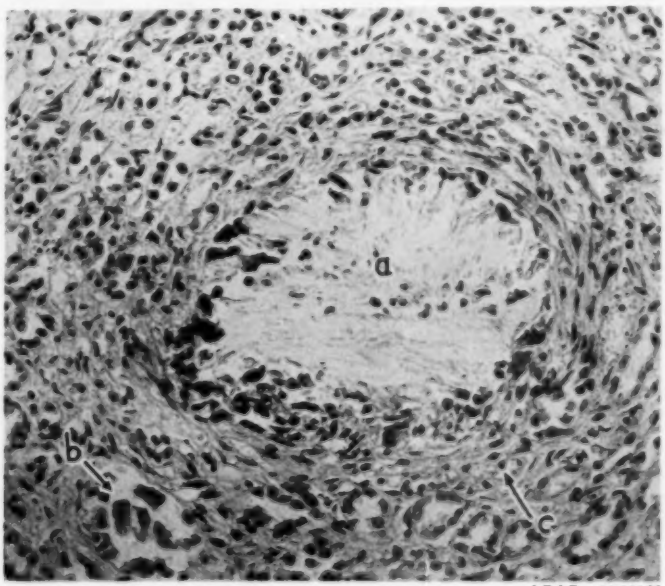


Fig. 12—Tubule (a) of a kidney of a steer (case 7) containing sulfadiazine crystals (note the tissue reaction around the crystals); (b) tubule containing detached viable epithelial cells; (c) connective tissue proliferation. x 210.

—A.F.I.P.—55-21566

pear to have separated from the wall to form foreign body giant cells. Frequently, the tubular cells are separated (fig. 12.) and connective tissue cells proliferated, which give the tubules a collapsed appearance. The glomeruli appear cellular, degenerated, and an occasional afferent arteriole shows an arteritis. These findings were consistent with those previously described.[1-3]

Diagnosis.—Sulfonamide intoxication in a steer due to mechanical blocking of the tubules of the kidney by sulfonamide crystals.

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Case 8—SULFONAMIDE INTOXICATION EXPERIMENTALLY PRODUCED IN A HEIFER—*J. H. Sautter, D.V.M., Ph.D., and C. M. Stowe, V.M.D., Ph.D.*

History.—A group of cattle was used to study sulfaquinoxaline toxicity. A 250-lb. heifer, 5 months old, in a good state of nutrition was given 250 gr. of sodium sulfaquinoxaline (1 gr./lb.) daily for four days. The first dose was given intravenously and the other 3 were given orally. The heifer had free access to water, mixed grain, and hay. She was euthanized, 24 hours after the last dose, by an injection of pentobarbital sodium.

At necropsy, petechiae and ecchymoses were found on the epicardium, the endocardium, and the serosa and mucosa of the rumen. Small tags of fibrin were present in many of the same areas. The surface of the kidneys were mottled yellow and red and the capsules were removed with ease. Yellow crystals were encountered in the major and minor calyces on the cut surface in the region of the collecting tubules and renal papillae (fig. 13). The kidney parenchyma was moderately friable. The urinary bladder and ureters contained numerous yellow crystals.

The yellow aggregates of crystals found in the kidney calyces were identified as N-4-acetylsulfanilamidoquinoxaline. In other animals similarly treated, crystals identified as 3-hydroxy-2-sulfanilamidoquinoxaline were found.* This is the first time the latter metabolite has been reported. It indicates that the bovine animal can oxidize as well as acetylate the sulfonamides.

Microscopically, the tissue damage is extensive. The changes consist of mechanical

Case 8 was presented by Dr. J. H. Sautter, School of Veterinary Medicine, University of Minnesota, St. Paul.

*Chemical analysis by courtesy of Sharp & Dohme, Division of Merck & Co., West Point, Pa.

Fig. 13—Sulfaquinoxaline crystals (arrows) in calyces of a bovine kidney (case 8).

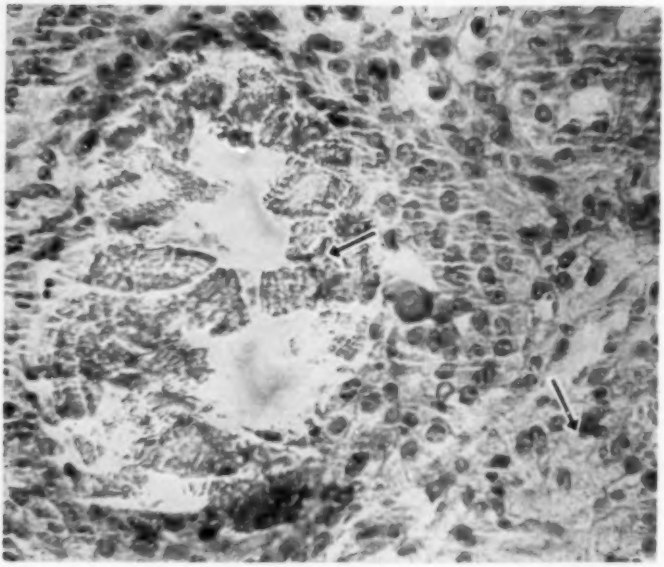

Fig. 14—Sulfonamide crystals (arrows) in collecting tubules of bovine kidney (case 8). Note proliferating cells around tubule.

plugging of the collecting tubules (fig. 14), thickening of the tubular epithelium, intertubular connective tissue proliferation, and granulomatous reaction in the various stages from macrophages to adult fibrous tissue formation in the cortex. Also there

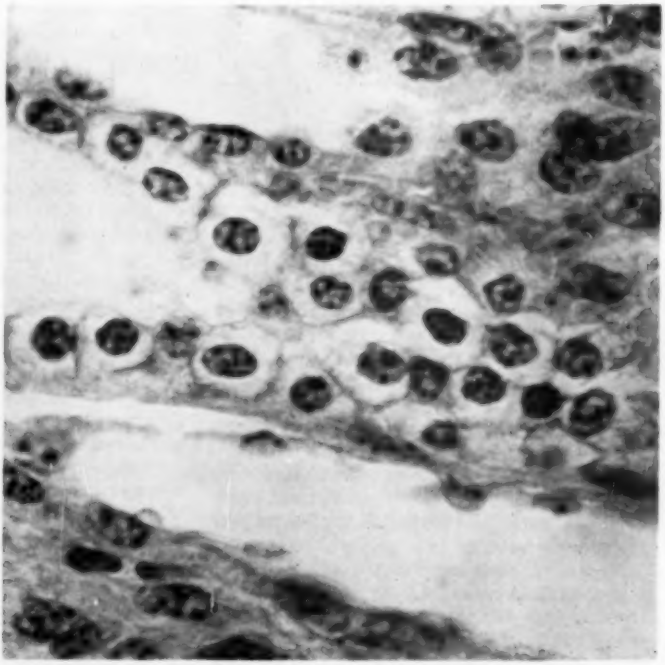

Fig. 15—Tubular epithelium of the bovine kidney (case 8) showing vacuoles and nuclei. x 1,000.

is extensive vacuolar degeneration of the tubular epithelium (fig. 15) and arteritis of the afferent vessels near the glomeruli. The glomeruli are damaged, the epithelium is degenerated, and many of the spaces between the capsule and the tuft contain pink-staining, hyaline-appearing material.

Diagnosis.—Acute sulfaquinoxaline poisoning in a heifer.

Discussion (Dr. C. N. Barron, Washington D.C.).—Sulfaquinoxyline in doses recommended by the manufacturer have been known to cause renal lesions when given to chickens for the treatment of coccidiosis.

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Copper Poisoning in Sheep.—Each fall, for three years, several sheep on a farm in Maine had developed jaundice, reddish urine, a humped appearance, and died within 24 hours. An excess of copper was found in the liver, in the rumen contents, and in the forage. Copper sprays had been extensively used on potatoes raised on this land.—*Maine Vet., Oct., 1956.*

Lamb Lameness in Lead-Mining Areas

For several years in Britain, lambs 2 to 10 weeks old have developed, and usually recovered from, a characteristic lameness when grazing on areas containing debris from old lead mines. Shortly after they begin to graze, the lambs develop a stiffness and depression, with a tendency to drag their hindfeet because the hocks and fetlocks are underflexed. Some develop a paresis and inhibited sensory perception. However, most of the recumbent lambs recover if properly nursed.

The lead content of tissues of affected lambs ranged from 11.0 to 94.0 mg./kg. of liver, 5.4 to 90.4 mg./kg. of kidney, and 0.61 to 2.7 mg. per liter of blood, compared with about 7.0 mg./kg. of liver, 2.4 mg./kg. of kidney, and 0.17 mg. per liter of blood in the unaffected lambs.

The herbage from affected farms contained 427.0 mg. of lead per kilogram of dry matter, compared with 33.0 mg./kg. on farms where lambs were not affected. Recovered lambs were stunted but they later reproduced normally. Ewes, cows, and calves were not affected.—*Vet. Rec., Oct. 20, 1956.*

Megasul Intoxication in Chicks.—Megasul, an anticoccidial compound widely used in poultry feeds for several years, is toxic when fed above levels of 0.0125 per cent. The chicks developed postural and locomotor disturbances, with increased excitability, resembling the nervous form of Newcastle disease. Weight gains were progressively decreased as the drug level increased and there was a decrease in thrombocytes and muscular and subcutaneous hemorrhages. The heterophilia was in contrast to agranulocytosis reported with other coccidiostats. Liver changes were also present.—*Poult. Sci., Sept., 1956.*

[Poisoning of dogs has been reported when their feed was contaminated with megasul in a mixer previously used for chicken feeds.]

Milkers' Nodules

The development of milkers' nodules in eight persons in Virginia is reported. The nodules appeared as tiny, erythematous macules that, in about four weeks, developed into thickened papules about 1 cm. in diameter. After two weeks, they resolved without scar formation, the entire course taking six to eight weeks.

The condition seems to be infectious, almost always appearing first in cows, then on the hands and forearms of milkers. The cow usually has several lesions which cause local tenderness but no systemic effects. A viral cause is assumed and inclusion particles in the epidermal cells have been reported. Attempts to transmit the disease by inoculations of tissue suspensions have been unsuccessful in man and in animals.—*J.Am.M.A., Nov. 10, 1956.*

Mycobacterium tuberculosis was found in enlarged, hyperemic lymph nodes in 16 of 20 tuberculin-reacting cattle with no other positive lesions, in Croatia.—*Vet. Bull., Sept., 1956.*

Recent Observations on the Course and Treatment of Bovine Lead Poisoning

P. B. HAMMOND, D.V.M., Ph.D., and D. K. SORENSEN, D.V.M., Ph.D.

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IN SPITE of a long-standing awareness of the hazards associated with the careless use and disposal of lead-bearing compounds, lead poisoning continues to take a significant annual toll among cattle. It remains a clinical problem for those engaged in large animal practice.

The presentation of these recent experiences in the treatment of bovine lead poisoning is timely largely because of the recent introduction of CaEDTA* as a specific therapeutic agent for lead poisoning. Reports[1,2] on the use of this drug in cattle are encouraging but are not sufficiently extensive to make possible a definitive appraisal of its merits and shortcomings.

The cases reported here were submitted to the veterinary clinic of the School of Veterinary Medicine, University of Minnesota. It was possible to obtain quantitative data on blood lead levels before and during therapy, since the senior author was concurrently engaged in a study aimed at developing a simple, rapid method for the detection of lead in the blood and liver of cattle suspected of being affected with lead poisoning.[3] The blood level data reported in this paper were obtained by using the dithizone method as recommended by the American Public Health Association.[4] The error was never more than ± 10 per cent of the values reported.

CLINICAL OBSERVATIONS

The clinical syndromes in this series of animals were somewhat variable, probably due to the varied conditions of exposure, age, and breed. Approximately equal numbers of dairy and beef-type animals, from 2 months to several years old, were involved. In only 2 of these animals were marked excitement and convulsive episodes seen, and both died shortly after the onset of the signs. The other affected animals were in variable states of depression and weakness throughout the course of illness. Ataxia, occasional circling, fine muscle tremors, and hyperesthesia were frequently observed. Some degree of blindness, as manifested by a tendency to bump into objects, was apparent in all but 4 animals. The eyes usually appeared normal when observed with an ophthalmoscope, but retinopathy, as indicated by a blurring of the disc margins, was observed in 2 animals. Since the lesion did not progress, it was impossible to ascertain whether these were early cases of papilledema or of papillitis. A diminished pupillary reflex, such as is frequently seen in animals with depression associated with other diseases, usually was evident.

Gastrointestinal signs consisted of complete anorexia, generally with grinding of the teeth, and diarrhea. Intermittent constipation was seen in several animals, particularly during the early part of the illness. Rumen motility was always greatly diminished or totally absent. Although it was difficult to clearly establish the presence of pharyngeal paralysis, several animals were seen to place their muzzles in water as though attempting to drink, without success. Laborious chewing and the accumulation of feed in the mouths of some animals also suggested varying degrees of pharyngeal or buccal paralysis.

Febrile reactions were sometimes observed. The 2 animals showing frank convulsive seizures had rectal temperatures of 108 F. and 106 F., respectively, possibly due to the extreme muscular effort associated with the convulsions or to the effect of lead on the central nervous system, or both. Moderate febrile reactions were observed in some of the animals with more protracted cases, probably the result of secondary infections, although objective signs were not always clearly apparent.

All signs, including those of blindness,

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Minnesota Agricultural Experiment Station, University of Minnesota, St. Paul, scientific journal series paper No. 3600.

Much of the information included in this paper also appears in Dr. Hammond's thesis, "A Simplified Laboratory Procedure for the Diagnosis of Lead Poisoning in Cattle," submitted to the graduate faculty, University of Minnesota, in partial fulfillment of the Ph.D requirements.

*Monocalcium disodium ethylenediaminetetraacetate, also referred to as calcium disodium versenate, produced by the Dow Chemical Co., Midland, Mich.

were reversible. The only exception was a residual ataxia in 1 animal, which persisted for several weeks after the return of appetite and general well-being. The animal was sold for slaughter.

TABLE 1—The Relationship Between Initial Blood Lead Levels and Survival of Treated Animals

μg. Pb^{++}/ml. blood	No. treated	No. surviving
0.25-0.5	1	1
0.5-0.75	--	--
0.75-1.0	5	5
1.0-1.5	4	2
1.5-2.5	2	0
Total	12	8

Examination of the peripheral blood of the poisoned animals revealed one diagnostically significant alteration—the presence of basophilic stippling of erythrocytes which was present in all but 1 of the animals. Usually, fewer than one erythrocyte per thousand showed stippling but, since this is not seen in the blood of normal cattle, its presence can be helpful in diagnosis. The stippling persisted many days following the onset of signs. The stippling associated with lead poisoning was less dense with respect to number of stipples per cell than was the case in stippling associated with anemia. No other consistent changes in the blood picture were noticed. Measurements made included hemoglobin (Gm./100 cc.), erythrocyte counts, total leukocyte counts, and differential leukocyte counts.

THERAPEUTIC MEASURES

The principal objective was to discharge the animals to their owners for convalescence in the shortest time possible. The only concession made to controlled experimentation was the exclusion of any drugs (other than CaEDTA) which remove lead from the body circulation. Such drugs as dimercaptopropanol (BAL), sodium citrate, and calcium salts fall in that category.

The schedule of treatment consisted of the administration of monocalcium disodium ethylenediaminetetraacetate (CaEDTA) twice daily on an intermittent basis. The amount of CaEDTA administered per dose was more than twice that used[1] for calves experimentally poisoned with lead and more than twice that generally used in human lead poisoning therapy.[5] This doubling of dosage was deemed necessary in view of the disappointing results obtained in the first few animals treated. The drug was always diluted with normal saline solution or 5 per cent dextrose solution before administration. The final concentration of CaEDTA was 1 to 2 per cent w/v. The drug was generally equally administered by the intraperitoneal and subcutaneous routes (table 2). The parenteral route of administration appears to make little difference in the rate of disappearance of CaEDTA from the body.[6,7]

The most important and consistently used form of adjuvant therapy consisted of the daily feeding of alfalfa leaf meal, corn, oats, and a dairy concentrate in liberal quantities of water, administered with a stomach tube, to all animals showing complete anorexia. Dehydration sometimes became sufficiently severe to require the initiation of parenteral fluid therapy. Sometimes, sodium bicarbonate was given orally when diarrhea and acidity of urine suggested probable acidosis. When febrile reactions were observed, the animals were treated with antibiotics; the body temperature always returned to normal.

EVALUATION OF THERAPY

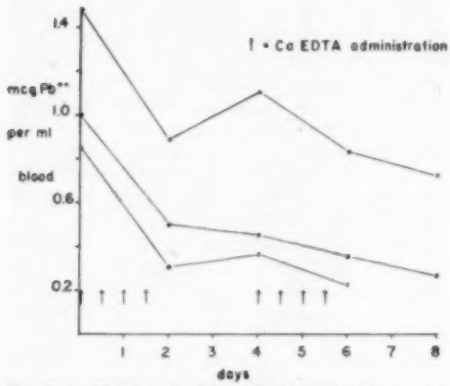
The benefits derived from the therapeutic use of a drug may be assessed by a variety of criteria, but no single one is ever fully satisfactory. In evaluating clinical material,

TABLE 2—Summary of CaEDTA Therapeutic Regimen and Therapeutic Responses of the 8 Successfully Treated Animals

Initial blood lead levels μg. Pb^{++}/ml.	CaEDTA mg./lb./dose*	Route of administration†	Schedule‡	Days required to effect recovery
0.83	30	i.v.	+2,−2, +6	11
0.80	35	s.c.,i.p.	+2,−3, +2	11
1.03	50	i.v.	+2½	4
0.41	50	i.v.	+2½	16
1.5	50	s.c.,i.p.	+2,−2, +2	12
1.0	50	s.c.,i.p.	+2,−2, +2	15
0.82	50	s.c.,i.p.	+2,−2, +2	14
1.15	50	s.c.,i.p.	+3,−5, +2½	5

*These doses were given twice daily. †i.p.=intraperitoneal; i.v.=Intravenous (jugular); s.c.=subcutaneous (axillary space). ‡Expressed as numbers of days on treatment (+) followed by number of days off treatment (−).

there is always the problem of attempting to judge what would have happened had animals not been treated. In the specific case of bovine lead poisoning, the authors are not aware of any studies concerning the mortality among untreated field cases. For this reason, the mortality among the



Graph 1—Changes in blood lead levels during the course of CaEDTA therapy.

animals treated with CaEDTA (table 1) can not be interpreted as indicating the percentage of animals saved by the drug; it can only indicate roughly what measure of success may be attained with treatment.

It is of some interest that there appeared to be a rough correlation between blood lead levels, when first determined, and the ultimate fate of the animals. This is emphasized since blood lead level determinations may ultimately prove clinically useful and practical. It is hoped that the prognostic value of such determinations may eventually be evaluated on a larger number of cases.

The time required to effect recoveries is reported (table 2). The criterion used to define "days required to effect recovery" was the number of days that elapsed between the initiation of therapy and the resumption of spontaneous eating and drinking. This was usually from ten days to two weeks. The question arises as to whether the course of illness actually was shortened as a result of the administration of CaEDTA and what it would have been had the animals simply been given supportive therapy. However, the usual pronounced fall in blood lead levels, as a result of CaEDTA treatment, would not likely occur spontaneously. Other data[8] indicate that a slow spontaneous decrease in blood lead levels may be expected in untreated poisoned calves, at least subsequent to the first three or four days of the course of clinical illness. The initial blood lead levels of the 3 animals (graph 1) were determined respectively, two, four, and six days following the onset of clinical illness. The fall in lead values obtained would not appear to be spontaneous. The animals appeared brighter either during or immediately following any given series of CaEDTA administrations. It is the authors' opinion that CaEDTA therapy probably is of some value in accelerating the rate of recovery but that good supportive therapy is at least of equal importance.

SUMMARY

Observations on a series of fatal and nonfatal cases of bovine lead poisoning are reported. Clinical signs seen were similar to those that have been reported by others. The only significant hematological alteration noted was basophilic stippling of erythrocytes.

Some evidence is presented suggesting that the blood lead level at the time of the onset of illness may be of prognostic value. Monocalcium disodium ethylenediaminetetraacetate appears to reduce blood levels of lead and probably accelerates the rate of recovery. Ten days to two weeks of intermittent treatment was generally required before animals could be discharged.

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A Microscopic Congenital Cerebellar Anomaly in Pigs

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NERVOUS SYMPTOMS occurring in a herd of 160 spring pigs presented a problem in diagnosis. The 20 gilts and 2 sows began farrowing in March, 1955, and 30 pigs had been lost by July 15 when the local veterinarian* asked the School of Veterinary Medicine, Alabama Polytechnic Institute, Auburn, for assistance in diagnosis and treatment.

The condition was first noticed in a litter of week-old pigs. The veterinarian reported that the first signs of illness were white diarrhea, in some of the pigs, and incoordination. When aroused, the pigs would try to run but would fall and kick; sometimes they would whirl around several times. Some were affected in the frontlegs more than in the hindlegs, and vice versa. The appetite remained normal, but the affected pigs did not do well. Pigs showing symptoms one day would appear normal the next; however, the symptoms recurred and, in most instances, became more severe. Spring pigs of all sizes were affected.

The owner stated that pigs in some litters began scouring when they were a few days old. Soon, a few of them were unthrifty, had difficulty in walking, and appeared to be drunk or dizzy; the degree of abnormal behavior seemed to vary in individuals from day to day. These signs were always more noticeable when pigs were excited or had been running. The pigs usually became weaker and, finally, died; losses occurred slowly, usually 1 or 2 a week.

Some litters were not affected but, in a majority of litters, at least 1 pig developed the symptoms. All sows were treated for roundworms six to eight weeks after breeding. The herd was on a lush oat pasture and was fed a ration of chopped corn, rolled oats, and alfalfa meal that was ground and mixed on the farm. The pigs were creep-fed with commercial pig pellets.

On necropsy of the affected pigs that died or were destroyed, no significant gross pathological alterations were found. The condition had not occurred in the pig crop of the previous fall, even though the same boar had been used. All of the sows and gilts had been raised on the place. The boar was bought in June, 1954, and originated in a herd from which some of the breeding females had also been obtained. Investigation indicated that there was some inbreeding. The gilt mothers and the affected pigs were sired by different boars of the same breeding, although the degree of relationship was not specified. When some of the same sows (gilts) were rebred to a different boar, the condition did not reappear. There has been no recurrence in any pigs farrowed since then.

PATHOLOGICAL FINDINGS

Seven pigs from the herd were subjected to some type of examination. The first pig, killed when 6 weeks old, showed no significant gross lesions. Since it had shown difficulty in walking, some of the joints were cultured for *Erysipelothrix rhusiopathiae*, but no growth was obtained. Formalin-fixed specimens of brain, cord, and liver from another affected pig were then submitted; the cerebellum was not included. No significant pathological alterations were seen on histological examination of these tissues. Several weeks later, brain and spleen specimens from a third pig were received, part in glycerin and part in formalin. Rabbit inoculation with the glycerin-preserved specimens failed to yield the virus of Aujeszky's disease. Histological examination of the brain revealed nothing of significance except strangely misshapen nuclei in some of the Purkinje's cells in the cerebellum. The possibility that this nuclear abnormality was associated with the symptoms shown by the pigs was not seriously considered until subsequent examination of 4 additional pigs from the farm showed that 2, showing nervous symptoms, had misshapen nuclei in some of the cere-

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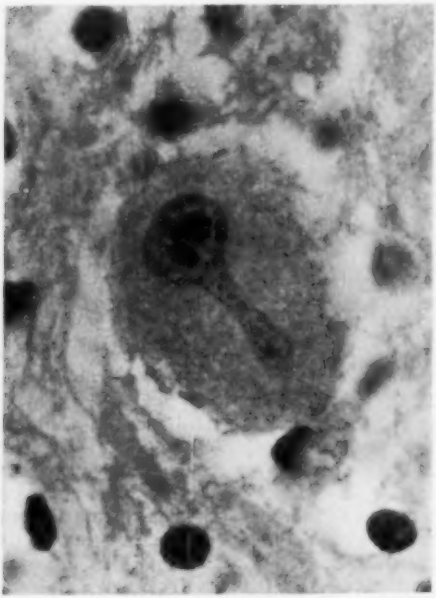

Fig. 1—Purkinje's cell of a pig with nucleus shaped like an Indian club. x 1,200.

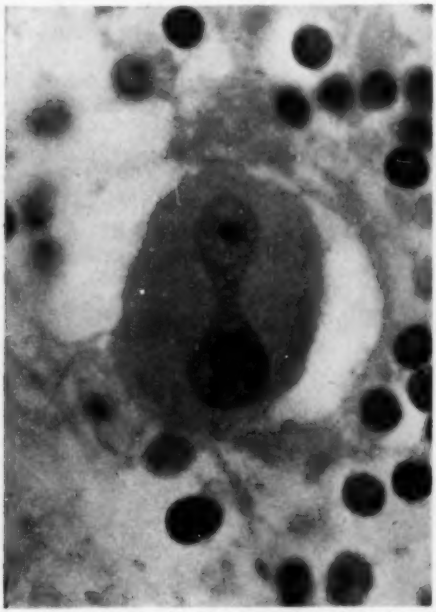

Fig. 2—Purkinje's cell of a pig with nucleus shaped like a dumbbell. x 1,200.

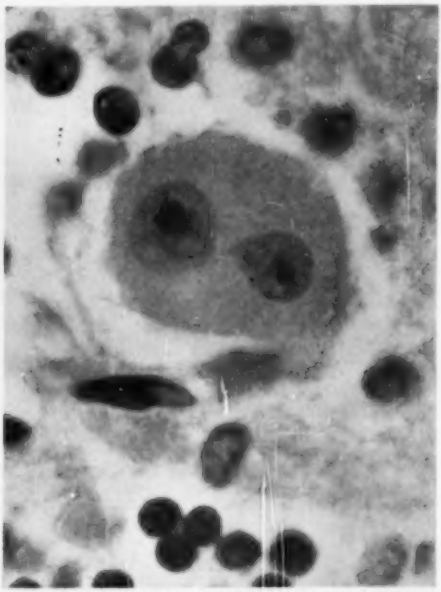

Fig. 3—Purkinje's cell of a pig with bilobed nucleus. x 1,200.

bellar neurons, whereas 2, with no nervous symptoms, had normal neurons.

The misshapen Purkinje's cell nuclei resembled an Indian club (fig. 1) or a dumbbell (fig. 2), depending on the degree of abnormality. The character of the abnormality was entirely different from the shrinkage artefacts and distortion of the nuclei that often occur. In a few instances, the nuclear substance had separated into two small, round spheres connected by a slender strand of nuclear material (fig. 3). Aside from their abnormal shape, the affected nuclei appeared normal. The cytoplasm of affected Purkinje's cells was generally more finely granular (chromatolysis) and stained somewhat less intensely with hematoxylin than the normal cells.

SUMMARY

A syndrome in young pigs consisting of incoordination, ataxia, dizziness, unthriftiness and, finally, death was found to be associated with misshapen nuclei in some of the Purkinje's cells of the cerebellum. Study of the herd history gave indications that the condition probably was a congenital anomaly.

Cassette Holders for Large Animal Radiography

FRED L. WILLIAMS, Ph.C.

Pullman, Washington

It is difficult to find appropriate holders for cassettes to be used in large animal radiography, which will secure the desired radiograph and at the same time mitigate the danger to the attendants from radiation and from injury by the animal patient. Four different types of cassette holders have been designed by the author and found to be of assistance in this work.

TYPES OF CASSETTE HOLDERS

Cassette Holder 1.—An end and top view of a cassette holder used for taking an anteroposterior or lateral view of the fetlock joint are illustrated (fig. 1, 2). For the anteroposterior view, the central ray passes through the fetlock at an angle of approximately 35 degrees and is perpendicular to the film. This angle eliminates, as far as possible, the superimposement of the bones of the joint on the radiograph. This cassette holder can, in addition to the fetlock area, be used for radiographs of the first, second, and third phalanx and the sesamoid bones.

Mr. Williams is assistant professor and radiologist in the Department of Veterinary Clinical Medicine and Surgery, College of Veterinary Medicine, State College of Washington, Pullman.

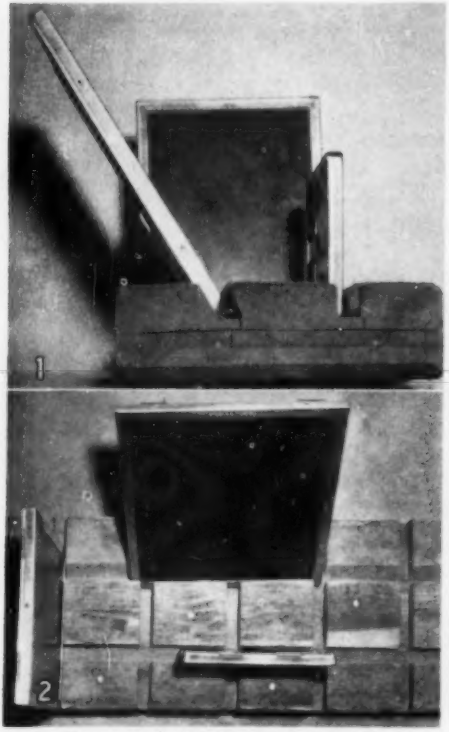

Fig. 1—End view of cassette holder 1.
Fig. 2—Top view of cassette holder 1.

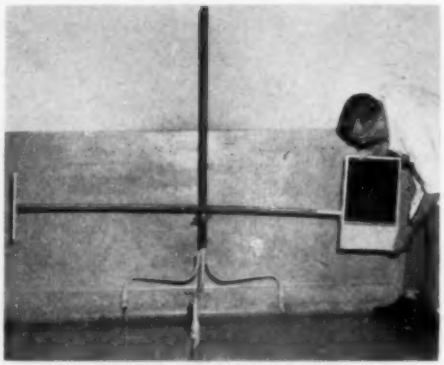

Fig. 3—Cassette holder 2.

Cassette Holder 2.—A flexible cassette holder used for taking anteroposterior, posteroanterior, or lateral views in the vicinity of the tarsal or carpal joints is illustrated (fig. 3). The horizontal rod is

Fig. 4—Anteroposterior view of a carpus.
Fig. 5—Lateral view of a carpus.

connected to the vertical rod of the stand by a universal joint which not only allows for 360-degree movement, but also allows the horizontal rod to be drawn freely through this connection. Thus, the cassette holder frame can be placed nearer to or further from the stand than is illustrated. In addition, the cassette holder frame can be rotated 90 degrees on the horizontal rod.

An anteroposterior view of the carpus (fig. 4) and a lateral view of the carpus (fig. 5), taken with this cassette holder, are shown.

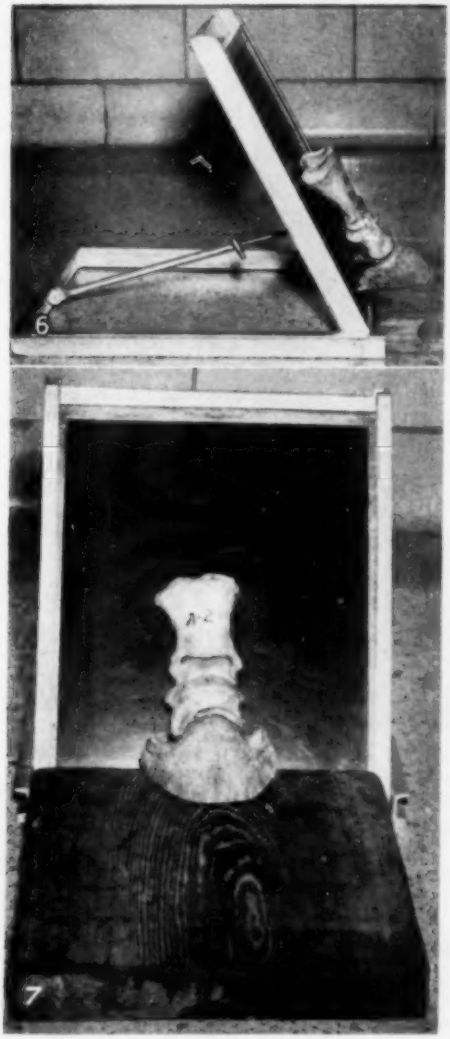

Fig. 6—Side view of cassette holder 3.
Fig. 7—Front view of cassette holder 3.

Fig. 8—Anteroposterior view of the foot of a horse.
Fig. 9—Lateral view of the foot of a horse.

Cassette Holder 3.—Illustrations are shown of a side view (fig. 6) and an end view (fig. 7) of a cassette holder which serves the same purpose as cassette holder 1. Cassette holder 3 is made of metal, has flanges arranged to take a 10- by 12-inch cassette and has a horizontal rod set-screw so that it can be adjusted to any angle from 25 degrees to approximately 160 degrees.

An anteroposterior and a lateral view of the foot of a horse are shown (fig. 8, 9). These radiographs were taken using cassette holder 3; however, cassette holder 1 could have been used.

Cassette Holder 4.—Several views of a relatively simple cassette holder are shown (fig. 10, 11). It is merely a box constructed of ½-inch plywood, with heavier braces, to fit a 10- by 12-inch cassette. A horse may put its foot on the box with a cassette inside and the cassette will not be scratched or otherwise damaged. The horse's foot is so placed that the exposure is made at a 60-degree angle (anteroposterior) from the top of the foot through the coffin joint.

Radiographs of the horse are taken in this position to best demonstrate the distal sesamoid or navicular bone. A projection to show the coronary border of the third phalanx may be made by changing the angle of exposure to approximately 55 de-

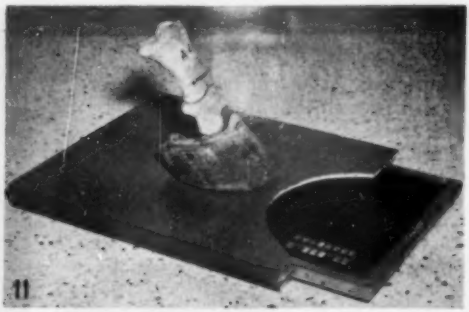

Fig. 10 and 11—Cassette holder 4.

Fig. 12—Radiograph of third phalanx of a horse.

grees. A radiograph taken with this cassette holder is illustrated (fig. 12).

CONCLUSION

Several inexpensive, easily constructed cassette holders for large animal radiography are illustrated and indications for their use are mentioned. The primary purpose of these cassette holders is to prevent excessive exposure to radiation by those engaged in taking radiographs. Proper cassette holders are also important in eliminating motion of the cassette.

Urinary Antibodies of Leptospirosis.—Antibodies could usually be demonstrated in the urine of patients with Leptospira infection by the tenth day of illness and almost invariably by the second or third week. Antibodies were also found in the urine of dogs infected with *Leptospira canicola*. Urinary antibodies were more helpful in determining the type of Leptospira than were serum antibodies.—*Vet. Bull., Oct., 1956.*

Human Leptospirosis from a Cow.—A dairy farmer in Ohio became ill 13 days after handling an aborted bovine fetus. Nine days after onset of illness, serological tests for several Leptospira species were negative, but four weeks after onset, the man was positive for *Leptospira pomona* in a dilution of 1:512. The cow was positive for *L. pomona* at 1:1,024.—*Pub. Health Serv., Nov. 9, 1956.*

Broken Teeth in Chinchillas.—When chinchillas break one incisor tooth, the opposite tooth may have to be filed down approximately every two weeks. If several teeth are broken, the animal may eventually have to be destroyed. If the opposing teeth are both broken, the animal may recover without treatment.—*Nat. Chinchilla Breeder, Oct., 1956.*

What Is Your Diagnosis?

Because of the interest in veterinary radiology, a case history and accompanying radiographs depicting a diagnostic problem are usually published in each issue of the JOURNAL.

Make your diagnosis from the picture below—then turn the page ▸

Fig. 1—Radiograph of the dorsoventral view of the horse's foot.

History.—A saddle-type stallion, 2 years old, developed a supporting lameness in the right foreleg, which gradually increased for two months, even though rest was enforced.

There was no increase in digital pulsation and no evidence of pain when the foot was examined with pressure tongs, but the horse moved soundly when the digital nerves were anesthetized.

A radiograph (dorsoventral view) was taken of the foot. The horse again moved soundly when a local anesthetic was injected into the coffin joint.

Euthanasia was performed when a favorable prognosis could not be assured.

(Diagnosis and findings are reported on next page)

Here Is the Diagnosis

(*Continued from preceding page*)

Diagnosis.—A sequestrum at the center of the articular portion of the third phalanx, possibly resulting from trauma.

Fig. 1—Distal articular surface of the coffin joint, showing an area of necrosis near the center of the articular surface of the third phalanx.

Fig. 2—Sagittal section showing a sequestrum in an area of necrosis in the articular portion of the third phalanx.

Our readers are invited to submit case histories, radiographs, and diagnoses of interesting cases which are suitable for publication.

This case was submitted by Dr. Fritz M. Nilsson-Sevelius, Halsingborg, Sweden.

Basophilic (Myelocyte) or Mast Cell Leukemia in a Cat

HANS MEIER, D.V.M., and GARY GOURLEY, D.V.M.

Boston, Massachusetts

LEUKEMIAS are among the most common tumors in cats, but visceral lymphosarcoma and carcinoma of the mammary glands seem to occur more frequently. Lymphoid leukemia is seen more often in cats and in other domesticated animals than the myeloid type.[4,5] A case of myelogenous leukemia in the cat[8] has recently been reported from the Angell Memorial Animal Hospital and, since then, several more have been observed. A cat with monocytic leukemia[5] has also been seen.

Mast cell, mast myelocyte, or basophilic leukemia is a variety of myeloid leukemia. It has rarely been observed in man;[1,6,11] only about 20 cases are mentioned in the literature.[9]

An excellent description of basophilic leukemia in a dog was published in 1953.[9] Necropsy revealed systemic lymphadenopathy, severe splenomegaly, and slight hepatomegaly. Intestinal obstruction and consequent peritonitis were thought to be secondary to enlargement of the abdominal lymph nodes. Blood studies disclosed leukocytosis (w.b.c. 68,200/cmm.) with basophilia (58.5%) and severe anemia (r.b.c. 2,150,000/cmm.). A myelogram, obtained from sternal puncture, exhibited basophils in great numbers (41.5%). Histologically, leukemic infiltrations composed of basophils were found in the lymph nodes, spleen, and liver.

In 1931,[6] and again in 1955,[10] the disease was reported in a cat. In both instances, however, a diagnosis of mast cell leukemia was assumed from histological study of limited material, since the condition was not suspected and its rarity not realized at the time. No blood and bone marrow examinations were reported.

In the 1931 case, the diagnosis rested on the marked splenohepatomegaly due to extensive mast myelocyte infiltration of the splenic pulp and mast myelocyte nodules in the liver. The presence of mast myelocytes in the lumens of blood vessels suggested leukemia, but in view of their small number, only a slight grade of basophilic myelocythemia was assumed. The cat, apparently in good health, died during pharmacological experimentation.

The 1955 report concerns an aged cat which died suddenly. Grossly, rupture of a large spleen and enlargement of the liver and most lymph nodes were found. Sections revealed great numbers of mast cells in these tissues.

Mast cell leukemia in cats was observed during work on canine mastocytomas,[2] but the findings have not been reported.

This paper reports a third feline case, the first in which a diagnosis was achieved during life.

CASE REPORT

History and Laboratory Findings.—On March 25, 1956, a 10-lb., castrated male tiger cat, 14 years old, was listless and acted as if he were in pain. The cat was depressed and had a temperature of 97 F. All the teeth were lacking and evaluation of the cat's condition by the oral and conjunctival mucosae was impossible because of heavy pigmentation. The abdomen appeared distended and palpation revealed an enlarged spleen. A nodular or spherical mass was felt at its lower pole. The superficial and abdominal lymph nodes were normal in size. The tentative diagnosis was splenic (blood vascular) tumor. Since a radiograph provided further evidence in support of this diagnosis, a splenectomy was planned.

On March 26, 1956, upon laparotomy, a small amount of straw-colored ascitic fluid escaped. The spleen almost filled the abdominal cavity. The mesenteric and ileocecal lymph nodes were cystic and appeared to be slightly enlarged. The liver was swollen and was a mottled brown-white in color. The whitish tissue appeared predominantly in perilobular areas. In view of the pathological changes in the spleen and the findings in other abdominal organs, the diagnosis was changed from splenic tumor to "possible myelogenous leukemia." The spleen was submitted to the laboratory and the report was "splenomegaly from mast cell infiltration, possibly basophilic myeloid leukemia." The cat recovered satisfactorily from surgery. Despite an unfavorable prog-

Dr. Meier is acting pathologist and Dr. Gourley is an intern at the Angell Memorial Animal Hospital, Boston, Mass.

nosis, the owner refused euthanasia, but agreed to a weekly check-up and serial blood studies (table 1).

TABLE 1—Hematological Findings in the Cat

Date of blood study	March 30, day of discharge after splenectomy	April 7	April 9 (prior to euthanasia)
Leukocytes (uncorr.)	24,200	22,100	31,300
Hemoglobin (Gm./100 cc.)	9.6	8.4	7.8
Differential:			
Myeloid series total (%)	74	85	94
Neutrophils			
Segments	44	34	54
Bands	8	26	25
Metamyelocytes	9	6	7
Myelocytes	2	10	2
Myeloblasts	0	0	1
Eosinophils	3	2	1
Basophils	7	4	4
Smudged myeloid cells	1	3	0
Lymphocytes	26	16	6
Monocytes	0	0	0
Nucleated red cells	3	2	4

The blood films were stained with Wright's and Giemsa's stains. Examination with the low power lens, to cover a large number of cells quickly, showed that the absolute and the relative increase in the number of basophils was conspicuous. According to the shape of their nuclei, basophilic myelocytes were most frequent, but occasional basophilic metamyelocytes and even band forms occurred (fig. 1). The myeloid series was totally increased and revealed a definite shift to the left. Platelets were numerous with occasional giant forms. There was moderate anisocytosis and basophilia which became more conspicuous with the progress of the disease.

From March 30 to April 7, the cat vomited occasionally but improved astonishingly. Its appetite was fairly good. On April 9, after a fight, the cat was found prostrate with evisceration through the old abdominal wound. The owner requested an emergency operation, but consented, two days later, to euthanasia which was accomplished by an intravenous injection of sodium pentobarbital. A necropsy was made immediately.

GROSS PATHOLOGY

Surgical Specimen (Spleen).—The spleen was about four times normal size, 25 by 8 by 4 cm., and was soft and gray. The pulpy consistency was not due to the blood content but to a diffuse infiltration by a whitish tissue which, on cross section, seemed to obscure any follicular pattern. The surface was irregularly nodular, the capsule was thickened by a sheet of gelatinous fibrin, and it felt gritty when cut, as if it contained some dystrophic calcification.

NECROPSY

The cat was in a fair state of nutrition, but it had a dull, dry coat and pale mucous

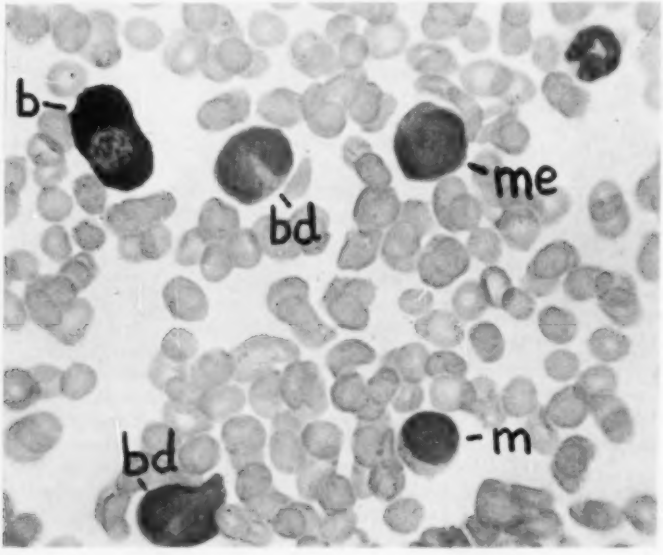

Fig. 1—Peripheral blood from a cat with mast myelocyte leukemia, showing a basophilic myelocyte (b). Immature cells of other types, including two early neutrophilic band forms (bd), a metamyelocyte (me), and a myelocyte (m), present in sufficient number (myeloid shift to the left), warrant a diagnosis of myelogenous leukemia. x 940.

membranes. The viscera were removed through the infected incision (cosmetic necropsy). The slightly enlarged liver was light brown with white spots, firmer than normal, and crisp. It seemed to be infiltrated by a white tissue which bulged on the cut section. All lymph nodes were normal in size, or only slightly enlarged, and were cream colored with a light brownish cast. The mesenteric and ileocecal lymph nodes had cystic enlargements filled with clear watery fluid. The sternal and anterior mediastinal lymph nodes appeared coalesced, with a distinct white cortex and a light brown medulla. The pancreas showed a more distinct lobulation than normal with multiple nodular areas protruding from it. The abundant femoral bone marrow was a pale brown-red. The other organs appeared normal.

HISTOPATHOLOGY

Tissues were fixed in 10 per cent formalin-mercuric chloride and most of the sections were stained with hematoxylin-eosin; the others were stained with Unna's polychrome methylene blue; 1 per cent aqueous toluidine blue; variation of Brachet's test; Schiff's periodic acid stain; and Giemsa's, Shorr's, and Masson's stains. Bone marrow smears were stained with Wright's stain.

Spleen.—There was severe hyperplasia of the red pulp, and the malpighian follicles were inactive and atrophic (fig. 2). The red matter was uniformly packed with a polyhedral-to-polygonal or spindle-cell type. The pattern, therefore, either resembled a densely arranged small cell carcinoma or was fascicular, as in sarcoma. The cytoplasm of the cells was usually abundant and slightly acidophilic, with numerous

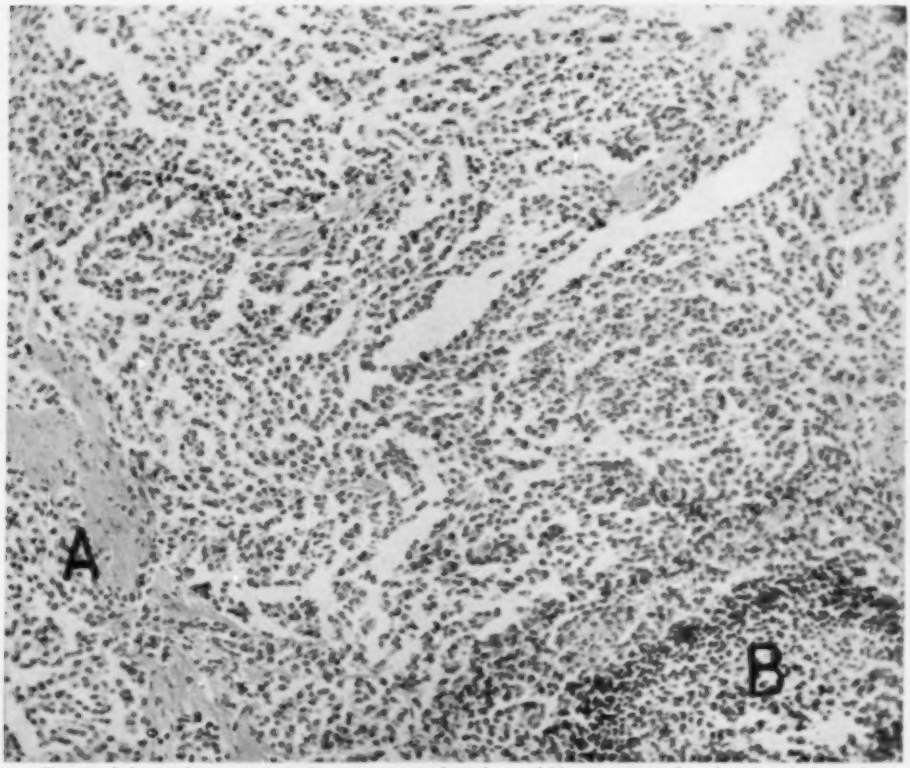

Fig. 2—Spleen of a cat revealing severe myeloid hyperplasia, invasion of trabeculae (A), and atrophy of the follicles (B). the neoplastic pattern of the red matter resembles a densely packed, small cell carcinoma of a fascicular sarcoma. Hematoxylin-eosin stain; x 100.

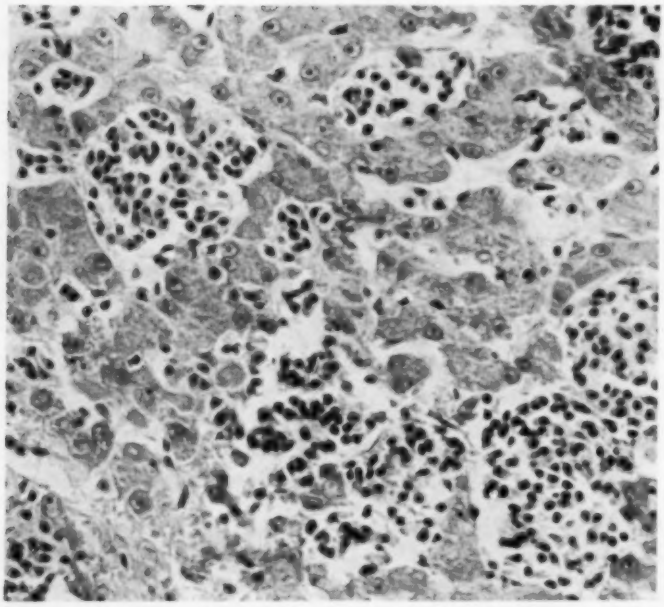

Fig. 3—Lobule of the liver of a cat with extensive leukemic infiltration into the sinuses. Hematoxylin-eosin stain; lower power, x 210.

small basophilic granules. The nuclei were dark and round or light, vesicular, and oval, all with marginal chromatin masses and a single central nucleolus. Occasionally, mitotic figures and uni- or multinucleated giant cell forms occurred. These granulated mononuclear cells heavily infiltrated the splenic capsule, trabeculae, and blood ves-

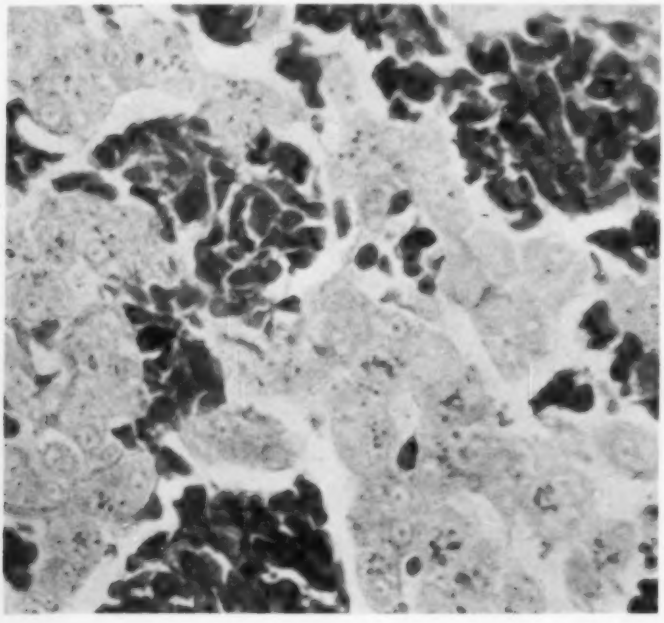

Fig. 4—Sinusoidal clusters of leukemia cells packed with metachromatic granules. Giemsa's stain; higher power, x 430.

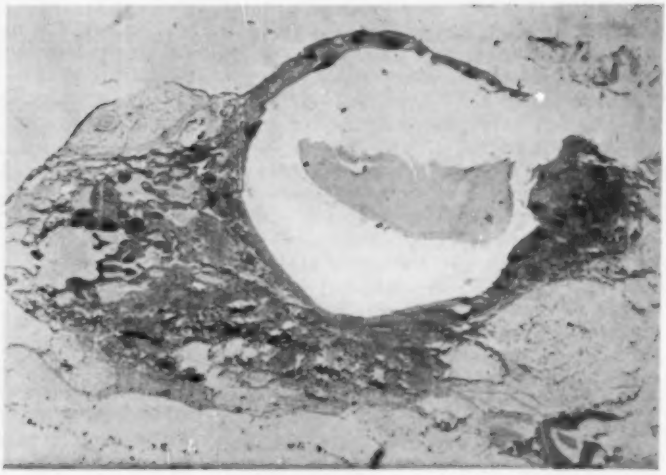

Fig. 5—Cross section of a mesenteric lymph node having a cystic appearance from lymph stasis. The lymphoid tissue had almost completely disappeared due to a myeloid basophilic transformation. Toluidine blue stain; x 25.

sels. There was no evidence of extramedullary hematopoiesis.

Liver.—There were extensive periportal infiltrations, with expansion into the liver sinuses forming small disseminated foci, and cellular accumulations around and in the central veins (fig. 3). The architecture of the liver was normal in only a few areas.

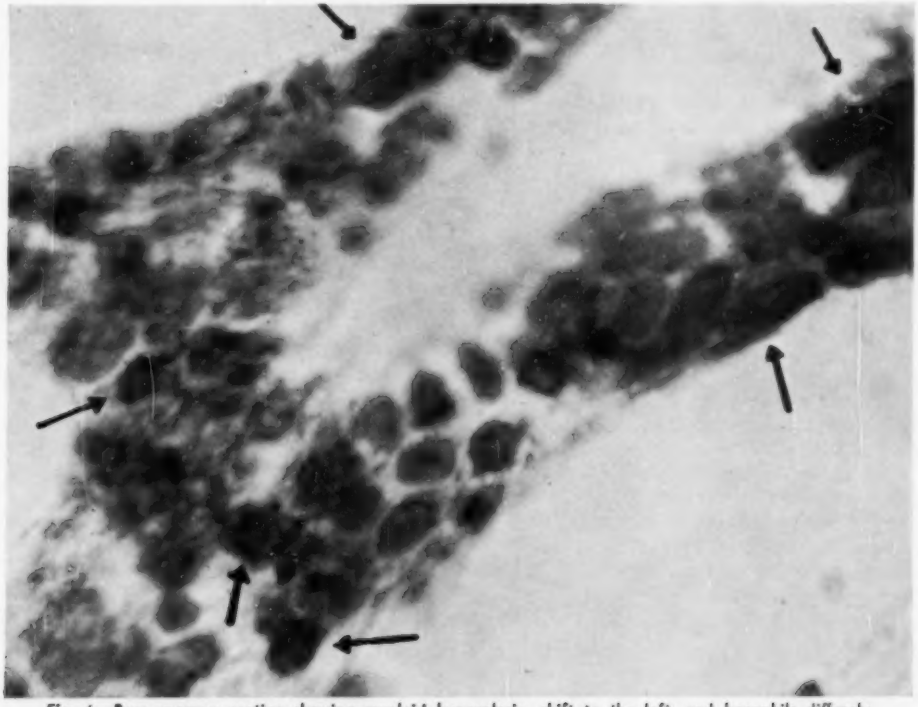

Fig. 6—Bone marrow section showing myeloid hyperplasia, shift to the left, and basophils diffusely scattered throughout (arrows). Giemsa's stain; x 900.

The infiltrative cells were identical to those in the spleen and lymph nodes. In areas of diffuse infiltration, the cells in the small sinusoidal clusters were elongated and polygonal (fig. 4). There was no extramedullary hematopoiesis.

Lymph Nodes.—The reticular portion of the lymph nodes was hyperplastic and replaced the atrophic lymph follicles. The sinuses were packed with discretely granulated mononuclear cells which also infiltrated the septums, the walls of blood vessels, the capsule, and expanded into the perinodal fat tissue. Many lymph nodes contained thromboses or had wide sinuses from edema and lymph stasis, which gave them a cystic appearance (fig. 5). No extramedullary blood formation was observed.

Bone Marrow.—There appeared to be myeloid hyperplasia with a shift to the left. Many megakaryocytes occurred, and there was active erythrocytogenesis. In the smears, basophils and eosinophils were present in definitely increased numbers. The basophils were scattered diffusely throughout the marrow (fig. 6) and also occurred in multiple tumor-like aggregations (fig. 7). These were not seen in the smears.

Lungs.—Occasional perivascular infiltration with mononuclear basophilic granulocytes was observed. In addition, there was slight focal, chronic interstitial pneumonia, particularly peribronchial, and some emphysema.

Other Organs.—In the pancreas, there was nodular hyperplasia and some island cell hyalinization, and the atrophied myocardial fibers in the heart had lost their striation and showed lipochrome pigmentation. There was a slight focal disseminated chronic interstitial nephritis, but the gut and adrenals were essentially normal.

By using a variety of stains, the tinctorial properties of the cytoplasmic granules in the neoplastic cells were established. With hematoxylin-eosin, tiny bluish granules could be seen in the majority of cells. In Giemsa and 1 per cent aqueous toluidine blue-stained sections, the granules were

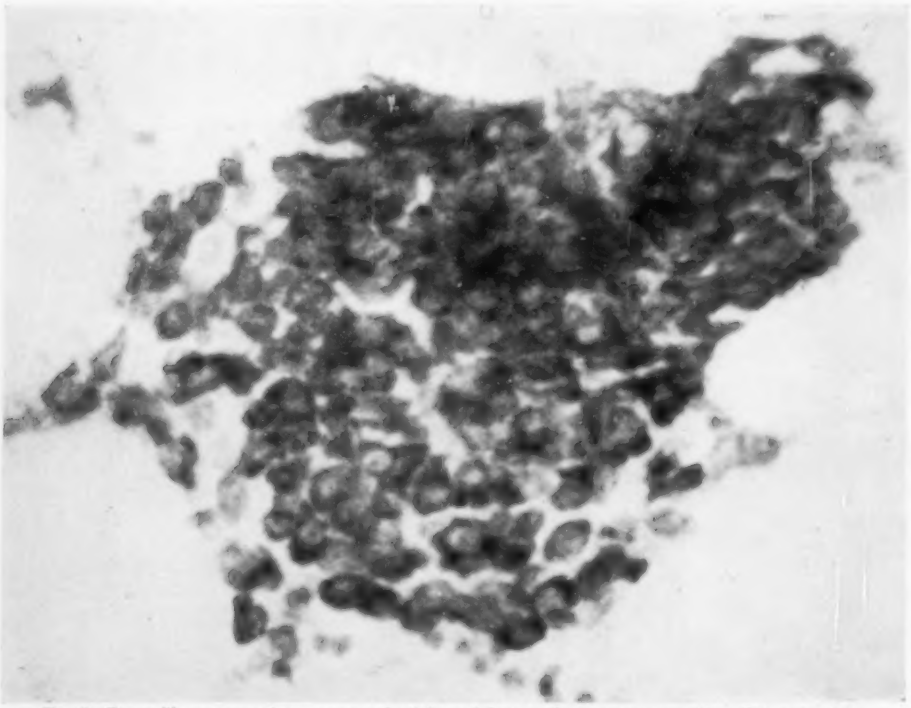

Fig. 7—Tumor-like aggregations composed of basophils in a bone marrow section. Giemsa's stain; x 900.

coarser, more abundant, and deep blue. They were blue with Unna's polychrome methylene blue, and purple with the variation of Brachet's test. Some stained positive with Schiff's periodic acid stain, but no granules appeared with Shorr's and Masson's stains.

DISCUSSION

This cat, formerly thought to be suffering from a splenic (blood vascular) tumor, was found to have a mast cell or basophilic leukemia. The possibility of myelogenous leukemia was suspected after surgical removal of a large spleen, observation of grossly evident leukemic infiltrations of the liver, and slight lymphadenopathy. Histologically, there was extensive myeloid proliferation composed of mast cells, and infiltration of many organs, including the spleen, liver, lymph nodes, bone marrow, and lungs. They were first identified in the surgical specimen (spleen) when a variety of staining techniques revealed mononuclear cells with metachromatic cytoplasmic granules. Despite the involvement of a multiplicity of organs, the primarily affected areas were still evident. The tremendous involvement of the spleen, liver, and lymph nodes seemed to exclude a metastatic colonization by malignant blood cells from the bone marrow, which was, by comparison, less involved. It suggested an *in situ* myeloid basophilic transformation in reassumption of the original blood-forming function by these organs.[11] In the lymphatic organs, the lymphoid tissue had almost completely disappeared and there were multiple infarctions in the lymph nodes, possibly from leukocytic thrombi. Microscopically, the bone marrow was complex from proliferation of all myeloid elements. There was a diffusely increased number of eosinophils and basophils, the latter tending to form small tumor-like clusters. Megakaryocytes were frequent and erythrocytogenesis appeared very active. In the absence of extensive myelophthisis, usually accounting for the crowding out of the erythropoietic tissue in myelogenous leukemia, severe anemia was lacking in this cat, although the hemoglobin level progressively decreased. Compensatory extramedullary erythropoiesis in other potentially hematopoietic organs did not, therefore, take place.

The increased number of basophils, both at the site of their normal formation and particularly in metaplastic organs, were reflected in the peripheral blood. However, in the differential counts, only a relatively small number of basophils were seen. Despite the fact that the blood studies were made only after removal of the spleen (the most bounteous source of mast cells in this cat), the unusual prominence of basophilic leukocytes was conspicuous because of the comparatively small proportion of basophils normally present in cats (av. about 0.1%).[3] Although large numbers of basophils occur only in myeloid leukemia, and basophils—unlike other granulocytes—decrease during acute infections, a sufficient number of other young myeloid cells in addition to the basophils warranted the diagnosis of myelogenous leukemia.[1] Recognition of the subvariety mast cell, or basophilic leukemia in this case, was based ultimately upon the exclusive tissue involvement with basophils.

The pain evidenced was probably associated with the tremendous enlargement of the spleen for, after splenectomy, the cat seemed to pick up considerably and the pain disappeared. How long the cat might have lived had the accident not occurred, is a question.

CONCLUSION

A diagnosis of chronic basophil myelocyte or mast cell leukemia in a cat was established by neoplastic occurrence of mast cells in various organs including the bone marrow. Although there was a slight, but definite, increase in the number of basophils in the peripheral blood, it presented only a faint reflection of the extensive organ infiltration by mast cells. From the excess of neoplastic changes, predominantly involving the spleen, liver, and lymph nodes, an autochthonous leukemic change was favored over a metastatic leukemic deposition by malignant blood cells from the bone marrow, which revealed only a comparatively scant involvement. Lack of extensive myelophthisis accounted for the absence of severe anemia and extramedullary erythropoiesis. Without taking into consideration the specific cell predominantly involved, particularly in the tissues, the diagnosis of a myelogenous type of leukemia was suggested by marked myeloid splenomegaly, visible infiltration of the liver, and grossly absent, or only slight, lymphadenopathy.

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Prussic Acid Reduced in Silo.—New growth Sudan grass or sorghum, which develops after the plants have been killed by frost, may contain enough hydrocyanic acid to poison grazing cattle but, if placed in a silo, some of the acid will be destroyed by fermentation and it will be diluted below the danger point. Interference with normal growth by drought or trampling, as well as by frost, causes these plants, and also wild cherry leaves, to become poisonous.—*News Serv., Rutgers Univ., Oct., 1956.*

Furazolidone for Salmonella Carriers.—Feeding furazolidone (0.04%) in the mash for 12 days to birds with a positive reaction to the agglutination test for *Salmonella pullorum* failed to significantly or permanently reduce the agglutination titer, and Salmonella persisted in 20 of 26 treated carriers. However, treatment markedly reduced the laying of infected eggs—only 2 of 466 eggs contained Salmonella. This suggests that the drug may be of use in the prevention of salmonellosis in turkeys and ducks.—*J. E. Wilson in Vet. Rec., Oct. 27, 1956.*

ACTH for Acute Induration of the Udder.—The treatment of severely inflamed udders by several previous methods usually resulted in restoring a normal but reduced secretion and in induration of the quarter. When 20 such cases were treated with ACTH and antibiotics, locally and generally, the inflammation largely disappeared within a few days (from all but 3), although the milk yield usually remained less than normal. The best response was to 100 I.U. of ACTH followed by 50 I.U. 48 hours later.—*J. C. Hindson in Vet. Rec., Oct. 20, 1956.*

Transmissible Bovine Leukosis

The transmissibility of bovine leukosis was shown by its gradual spread across Germany, its transmission by the movement of infected cattle, and experimentally.

Five years after 17 young cattle and 2 cows were inoculated with blood, milk, and tissues from infected animals, 7 of the 19 were leukemic, 3 had tumor-like leukotic nodules, 3 had slightly changed blood, and 6 remained healthy. The incubation period for leukemic changes of the blood was from two weeks to several months. Placental transmission was proved in 2 cases.

Transmission by contact, by infected milk, or by infected syringes and surgical instruments was considered possible. It was recommended that infected cattle be segregated or slaughtered and not be used for breeding.—*Vet. Bull., Oct., 1956.*

Nicarbazin and Egg Production.—Nicarbazin was used extensively in 1955 as a coccidiostat for young chickens at a feed level up to 0.015 per cent. In experiments with adult hens, a level of 0.0125 per cent slightly depressed egg production, and at 0.07 per cent production ceased in about ten days. They returned to production in ten days after the nicarbazin was removed. At levels of 0.005 to 0.0125 per cent, hatchability of their eggs was decreased by about 50 per cent but returned to normal within two weeks after the drug was discontinued. The apparent health and sexual development of the birds were not affected. Nicarbazin may be safely used but should be discontinued at least one week prior to the onset of egg production.—*Poult. Sci., Sept., 1956.*

Aspirin Therapy for Urolithiasis.—Of 19 human patients with recurrent uroliths who were given 2 Gm. of powdered aspirin daily, no new calculi appeared and existing stones did not increase in density or size in 17 patients for at least 18 months.—*Brit. Med. J., Sept. 15, 1956.*

When working with sheep, don't use their wool for handles.—*Livestock Conservation, Inc.*

Pyogenic Infections of the Skin and of the External Ear Canal in the Dog

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INFECTIOUS dermatoses occur relatively often in dogs. They develop, as a rule, in special breeds, particularly in short-haired dogs such as Dachshunds, Boxers, and Dalmatians. However, they have also been found in longer haired dogs, eg., German Shepherds and Irish Setters.

From the clinical standpoint, the etiological factors of various types of pyogenic dermatosis are complex. We are dealing not only with an infection caused systemically or locally by pyococci, but also with some other general or local conditions which play an essential part as predisposing factors.

The normal skin of animals has a bacterial flora which varies in different species and also in individuals. Similar individual variations of bacterial flora (streptococci, micrococci, Pseudomonas, Corynebacterium, and many other microorganisms) have been found on the normal skin of man.[1] The bacterial flora found on the skin affected with various types of pyogenic dermatosis, eczemas, hyperkeratosis, and parakeratosis was essentially different than that on the normal skin, depending on the respective type of the skin disorder.

For example, *Bacillus necrophorus* has been found in severe cases of furunculosis in dogs, and *Leptospira canicola* has been isolated[2] from a chronic and stubborn furunculosis in a Dachshund. A contagious impetigo in pigs in which *Micrococcus hyicus* was isolated and its pathogenicity proved experimentally has been described.[3]

The bacterial flora found on the skin of healthy animals does not produce any pathological changes of the skin unless there are special local conditions which allow the invasion of the microorganisms e.g., through injuries, abrasions or decubital changes, or general conditions impairing the resistance of the skin so that it forms a better medium for the bacterial flora. These general predisposing factors have been observed in dogs of various breeds as a result of a nutritional deficiency; in the course of some hormonal disorders, particularly when the production of the gonadal hormones was increased; and in the course of various internal disorders. A similar predisposing condition has been observed as a complication in the course of some intoxications such as thallium and ergot poisoning. Also, allergic conditions and various dermatophytic infections have been predisposing factors in the development of pyogenic dermatoses.

The degree of the local or general predisposing condition is responsible for variability and severity of such pyogenic dermatosis. Therefore, some pyogenic cutaneous infections develop as superficial pyogenic dermatosis, others appear as acne, furunculosis, or as the so-called "undermined pyogenic dermatosis" (fig. 1). There are also specific areas of the skin which, as predilection areas, are considered more prone to the development of dermatoses. The usual predilection areas are on the extremities, particularly the lower parts—the toes and interdigital skin. The more the general internal predisposition prevails, the more symmetrically are the cutaneous lesions distributed.

INFECTIONS OF EXTERNAL EAR CANAL

Pyogenic infections of the skin of the external ear canal are complicated by anatom-

Fig. 1—Deep undermined pyogenic dermatosis in a Boxer.

Dr. Kral is professor of veterinary medicine, School of Veterinary Medicine, University of Pennsylvania, Philadelphia.

Fig. 2—Superficial pyogenic dermatosis in a Boxer.

ical conditions in certain breeds, especially those with low-set, pendulous, and long-haired ears, such as Cocker and Springer Spaniels. These conditions prevent proper ear ventilation, maintain higher temperature, and support an accumulation of ear wax and moisture, offering the best medium for bacterial and other pyogenic flora. The most frequent microorganisms found in the external ear canal are not only Streptococcus and Micrococcus, but also Proteus, *Pseudomonas aeruginosa* (*Bacillus pyocyaneus*), Escherichia species, and others.[4]

Fig. 3—Superficial pyogenic dermatosis (Collie-nose) in a Collie.

A purulent inflammation of the external ear canal is characterized by a severe otorrhea. This pathological process has been, as a rule, chronic, resulting in hypertrophy and ulcer formation of the skin of the external ear canal, thus, essentially narrowing the lumen.

In 16 of 17 cases of otitis externa in dogs, Streptococcus was found in pure culture; in only 1 case was it found as a mixed culture with *Pseudomonas pyocyanea*.[5] On the other hand, it has been reported that the majority of cases of persistent otorrhea are due to *B. pyocyaneus* and *Echerichia coli*—both gram-negative organisms.[6] Blastomyces were isolated in 25 of 28 cases of otitis externa in dogs, and they were considered an essential etiological factor.[7] In many cases of otitis in dogs, we have found *Candida albicans* and other fungi.

The question, however, arises as to which of the above described microorganisms are the primary etiological factors, which are secondary factors, and which of them are nonpathogenic contaminants. According to our observations, the majority of the microorganisms found in the external ear canal in dogs are secondary factors; however, they may produce more severe pathological conditions than the primary factors.

Symptoms of Pyogenic Infections.—Clinical signs of the pyogenic inflammation of the skin are variable depending not only on the type of the infections but especially on the predisposing condition of the individual.

Superficial and Deep Infections

From a clinical standpoint, we distinguish two main types of the cutaneous pyogenic infection—superficial and deep.

Superficial Pyogenic Infections.—The superficial pyogenic dermatosis (fig. 2) is characterized by an inflammation of the superficial skin layers, forming erythematous, edematous, and weeping pussy conditions associated with a localized pruritus. These cutaneous lesions are usually found on specific areas which are predisposed to mechanical irritations and, thus, to secondary pyogenic infection. The areas are around the mouth, on the face, close to the anal glands, and in the perineal region, all

Fig. 4—Deep pyogenic dermatosis in a dog.

especially exposed to mechanical irritations.[8] In some breeds, the lateral surface of the elbow, stifle, and hock regions, as well as the inguinal and axillary regions, are frequently the site of pyogenic infections due to the mechanical irritation.

Superficial pyogenic dermatosis develops in Collies in the nasal region ("Collie-nose") (fig. 3). This condition starts as a pruritic erythematous inflammation at the junction of the hairless portion of the nose and the skin covered with hairs. Due to the secondary infection, the signs of a pyogenic dermatosis present further complications.

Deep Pyogenic Infections.—The deep form of pyogenic infection affects deeper parts of the skin in the form of suppurative inflammation of the hair follicles and sebaceous glands, resembling acne. When still deeper parts of the cutaneous or subcutaneous tissues are involved and are accompanied by necrosis, furunculosis develops (fig. 4). These deep and suppurative skin lesions frequently fuse in the subcutaneous areas forming the undermined pyogenic dermatosis.

Fig. 5—Chronic undermined pyogenic dermatosis in a dog.

This deep form of pyogenic dermatosis develops in dogs, as a rule, on specific areas, particularly between the toes (acne, interdigital furunculosis) or on outer parts of the extremities; however, it may develop on other parts of the body surface. It may be found on one leg only, or symmetrically on two or all four legs. It starts with painful inflammatory edema, with the formation of various sized abscesses which contain first grayish, then yellowish brown, fluid mixed with blood.

When this suppurative process in the interdigital area spreads to the coronet, purulent paronychia develops (fig. 5). Similar suppurative lesions have been observed on other parts of the skin in the form of swollen, undermined, and painful eruptions, with ulcers and openings leading in fistulous tracks and discharging yellowish brown fluid mixed with blood.

If untreated, chronic ulcers (*Pyoderma gangrenosum*) develop, spreading to form an edematous and undermined periphery.

By constant rubbing, licking, and scratching, the lesions may be spread to the adjacent areas and the inflammation assumes all the signs of a chronic, indurative dermatosis characterized by a hard thickening of the affected skin.

The general condition of the animals affected with superficial or deep pyogenic dermatosis does not show, as a rule, any special deviation from normal. However, in severe cases, there is an increase of leukocytes and in long-lasting and generalized disorders there may be gradual emaciation.

COURSE AND PROGNOSIS

The course of the pyogenic infection, especially of the deep and undermined form, is chronic. Sometimes the suppurative lesions may heal in one area but new lesions develop on other parts of the skin.

The prognosis should be guarded because the infection may last months or years, particularly in cases of chronic furunculosis from which *L. canicola* has been isolated. Treatment of such cases has not been successful, in spite of the application of all drugs used in the treatment of furunculosis and leptospirosis.[2]

TREATMENT

As the first step in treatment, it is necessary to remove the causative factors and to avoid any further mechanical irritation of the diseased area by various protective devises or by bandaging. The choice of medication depends on the kind of infection and character of the skin lesions. Therefore, the sensitivity test of the causative microorganism may be of great importance.

The superficial pyogenic dermatosis is the easiest form to treat. Pyogenic dermatosis caused by *Streptococcus pyogenes* or by *Micrococcus pyogenes* var. *aureus* responds well to penicillin, streptomycin, neomycin, and aureomycin® applied as lotions, creams, or sprays. However, some strains of Micrococcus and Streptococcus are resistant to these antibiotics. In such cases, we have recently found a new preparation, triocil,®* to be effective.

Triocil is a synthetic organic compound identified as bis-1, 3-betaethylhexyl-5 methyl-5-amino hexahydropyrimidine and has a strong affinity for tissues. It was applied locally to the affected areas by gentle rubbing into the skin twice daily for three to four days. The inflammation disappeared within 24 hours and other lesions shortly afterward. Triocil has also been found effective in treatment of some types of dermatomycoses. (The fungicidal activity of the drug will be reported later.) This local medication of superficial pyogenic dermatosis has been applied without any systemic treatment. Only when large areas of the skin have been involved have antibiotics been administered parenterally.

The deep form of pyogenic dermatosis always requires both systemic and local treatment. For systemic treatment, sulfathiazole and neoprontosil were used some years ago. Some cases responded satisfactorily; however, others developed into a chronic condition. These failures occurred in pyogenic dermatosis and also in chronic suppurative otorrhea.

Animals with lesions from which gram-positive microorganisms have been isolated responded to the administration of penicillin, streptomycin, neomycin, erythromycin, or aureomycin. However, in cases in which gram-negative organisms have been isolated, the results have not been satisfactory.

Autogenous bacterins made from cultures have also been recommended and used at our clinic. The dose for a medium-sized dog has been 3 cc. administered intramuscularly every other day for three or four times. Some dogs responded well.

Recently, we used enzymes for the systemic and local treatment of stubborn cases of cutaneous pyogenic infections, for otorrhea, and for severe cases of Collie-nose. We used pancreatic dornase, streptokinase, varidase, and streptodornase varizyme® intramuscularly and topically. For local application, the affected area must be cleansed, the pus removed from the abscesses, and the enzymatic solution injected into the fistulous tracts and kept there for two minutes. Open, ulcerative lesions have been treated by the local application of enzymes in packs soaked with enzyme solution.

Enzyme application has usually been combined with systemic treatment with antibiotics, particularly in severe infections. It has been the most effective therapy for deep pyogenic cutaneous infections; suppuration ceased in a relatively short time and only the inflammatory lesions remained as the final stage. These inflammatory lesions are either of an acute or of a chronic character, depending on the duration of the pyogenic dermatosis. Triocil has been applied locally in acute lesions of the final stage, and the iodine ointment, weladol,®† has been used in the chronic indurative skin conditions.

Radiotherapy for pyogenic cutaneous infections, particularly acne, furunculosis, and otorrhea, four to six doses of 180 to 240 roentgen units, 0.1 mm. Cu filter, 30 cm. F-HD, at two- to three-day intervals, has been recommended by several radiolo-

*Triocil was supplied by Warner-Chilcott Laboratories, Morris Plains, N.J.

†Produced by Weston Laboratories, Brooklyn, N.Y.

gists. After six to eight weeks, the treatment should be repeated, if necessary.

We prefer the enzymatic and antibiotic treatment.

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Mode of Action of Antibiotics on Bacteria in Young Calves.—When aureomycin® was fed to young dairy calves, it seemed to affect the physiology of the bacteria in the digestive tract rather than the number of bacteria. The phagocytic activity of leukocytes from calves under 2 weeks of age was lower than in calves 5 to 7 weeks old, but the antibiotic made the organisms more sensitive to phagocytosis.—*J. Dai. Sci., Oct., 1956.*

Antibiotic Checks Enterotoxemia.—When 798 lambs (av. 6.1 lb.) were placed in four feeding groups, there were no deaths from enterotoxemia while they were being fed chlorotetracycline, 10 mg. per lb. or more daily. There were 7 deaths, from this disease, per 100 lambs in 49 days in the group which received no antibiotic and 16 deaths per 100 in 28 days in another group after the antibiotic was removed.—*J. Anim. Sci., Aug., 1956.*

Oleandomycin, a New Antibiotic.—Certain staphylococci and streptococci resistant to any single antibiotic were often successfully controlled in patients by a combination of tetracycline and oleandomycin.—*Sci. News Letter, Oct. 27, 1956.*

Oleandomycin, isolated from cultures of *Streptomyces antibioticus*, is effective against many microorganisms which are resistant to the seven most commonly used antibiotics. However, 28 per cent of the strains of *Micrococcus pyogenes* that were resistant to erythromycin were resistant to oleandomycin also.—*Antibiot. Med. and Clin. Therap., Oct., 1956.*

Thyroprotein and Milk Production.—Thyroprotein may increase milk production as much as 20 per cent for a short period when fed to cows but the total milk for an entire lactation is not increased. There is an inevitable marked decrease when the drug is removed.—*Agric. Res., Nov., 1956.*

Efficiency of Livestock Production.—Since 1935-1939, the output per breeding unit of livestock has increased about one third—40 per cent more beef per cow, 20 per cent more pork per sow, 45 per cent more eggs per hen; and 30 per cent more milk per dairy cow. In the efficiency of feed conversion, there has been excellent progress with broilers and turkeys, some progress with hogs and beef cattle and in milk production, but none in egg production; however, the average dozen eggs today is perhaps 1 oz. heavier than 20 years ago.—*B. T. Shaw, U.S.D.A., Oct. 17, 1956.*

Boars of nine breeds went on test for rate and economy of gain and quality of carcass, at the Iowa swine testing station, in October. The breeds represented were Berkshire, Chester White, Duroc, Hampshire, Landrace, Poland China, Spotted Poland China, Tamworth, and Yorkshire as well as "hybrid" hogs.—*Wallaces' Farmer, Oct. 20, 1956.*

The back fat probe measurement is a reliable indication of a meat-type boar only when he is less than 6 months old, has been on full feed of corn since he weighed 60 lb., has gained rapidly and, at 200 lb., has no more than 1.2 inches of fat over the shoulder, back, and loin.—*Wallace's Farmer, Nov. 17, 1956.*

Babesiasis (Piroplasmosis) in Dogs

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CANINE babesiasis is not widely recognized in the United States,[1] but has been reported from Florida[2,3] and from Texas.[4,5]

The acute form of canine babesiasis is said to offer no difficulty in diagnosis.[3] It causes a high temperature, increased pulse and respiration, progressive anemia, jaundice, and hemoglobinuria. There is a history of tick infestation, and the causal organism (*Babesia canis*) can be demonstrated in the blood. The chronic form of the disease is difficult to diagnose because the causative organism often can not be demonstrated in the blood. The first signs are anemia, loss of condition, weakness, intermittent fever, and sometimes mucopurulent eye discharge and cough. In the later stages, jaundice with hemoglobinuria or biliuria may occur. Ticks are usually present. On necropsy, dogs show an enlarged, soft spleen, some icterus, and sometimes an enlarged, yellow liver and a gallbladder distended with dark, thick bile. Petechiae may be seen in the serous membranes.

In order to demonstrate the organism, it may be necessary to inoculate blood from the suspected animal into a susceptible dog. Splenectomy of the test dog will increase the number of organisms to be found in the blood stream. The purpose of this article is to describe 2 definite cases and 1 presumptive case of babesiasis of dogs from Florida.

CASE HISTORIES

Case 1.—A Boxer pup, 8 to 10 weeks old, from Pinellas Park, Fla.,* was one of 5 dogs that died in a litter of 6. The litter had been separated from the mother and kept in different homes for about one week when they all became sick, showing listlessness, vomition, anorexia, icterus, and "bloody" urine (probably hemoglobinuria). When examined during the second week in June, 1955, the pup had no fever and no diarrhea, but a few hookworm eggs were found in the feces. It did not respond to treatment with antibiotics and vitamin B_{12}.

A routine blood count on 1 of the pups revealed 1,260,000 r.b.c. per cubic millimeter, 3.1 Gm. hemoglobin, and 5,000 w.b.c. per cubic millimeter. A differential count "done under high power" revealed 50 neutrophils and 50 lymphocytes.

There was marked variation in size and shape of the erythrocytes along with marked polychromatophilia. Eight nucleated erythrocytes were found per 100 leukocytes. The blood smear from this animal was no longer available when subsequent histological examination showed that the dog had piroplasmosis.

Case 2.—A female Pointer, 5 years old, from St. Petersburg, Fla.,† had been in a boarding kennel for three weeks. One week after returning home, she began to show "phlegmatism," anorexia, severe icterus, and hemoglobinuria. When brought to the clinic during the third week in August, 1955, the hemoglobin determination was 4.6 Gm., but the erythrocyte and leukocyte counts were within normal limits. Acute piroplasmosis was suspected, but no Babesia were seen in a blood smear stained with Wright's stain. The dog died 72 hours later and, on necropsy, showed extreme splenomegaly with congestion of the liver and kidneys. No hemorrhages were seen.

Case 3.—In April, 1956, a Boxer pup, 5 weeks old, from Miami, Fla.,** was brought to the hospital with a temperature of 94 F. and died within 15 minutes. There appeared to be bile in the urine.

HISTOPATHOLOGICAL FINDINGS

The criterion on which definite diagnosis of babesiasis was based was the presence of organisms morphologically typical of *B. canis* within the erythrocytes. Many erythrocytes in the hepatic sinusoids and in the renal blood capillaries of dogs 1 and 3 contained small, ovoid, nucleated

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*Tissue specimens from this dog were furnished by Dr. W. W. Cunningham, Pinellas Park, Fla.

†Tissue specimens from this dog were furnished by Dr. R. F. Minnick, St. Petersburg, Fla.

**Tissue specimens from this dog were furnished by Dr. C. E. Bild, Miami, Fla.

Fig. 1—Renal blood capillary of dog 3 showing erythrocytes (arrows) containing Babesia. x 1,800.

parasites considerably smaller than the erythrocyte (fig. 1). The number of parasites within individual erythrocytes could not be accurately determined in the tissue sections because of the three dimensional character of the preparations and the closely packed arrangement of the blood cells within the vessels. However, touch preparations, from dog 1, made from freshly cut surfaces of the fixed kidney tissue and stained with Giemsa's stain revealed from 1 to 12 typical *B. canis* in some of the erythrocytes. The significant histopathological alterations in these 2 dogs were eccentric central necrosis of the liver, of the type resulting from anemia, and marked deposition of hemoglobin within the epithelium of the proximal tubules in the kidneys (fig. 2). The hemoglobin was in the form of orange-stained droplets of variable size within the cytoplasm of the tubular epithelium; no hemoglobin casts were seen in the lumens. The red pulp of the spleen of dog 1 was hyperplastic but the organ did not appear remarkably congested.

No Babesia were found in the erythrocytes of dog 2. The spleen was markedly congested and showed considerable deposition of hemosiderin. The sections of liver showed much bile stasis within the bile capillaries and heavy deposition of hemosiderin in the Kupffer's cells. Many of the lower renal tubules were blocked by casts composed of a mixture of both amorphous and crystalline hemoglobin and bile pigment. The blocked tubules showed damage of the lining epithelium from the presence of the casts. The epithelium of the proximal convoluted tubules was swollen and contained small granules of bile pigment and some hemosiderin. No leptospiras were seen in appropriately stained sections of the kidney.

It was concluded that the actual cause of death was nephrosis, the animal having survived the parasitemia. A presumptive diagnosis of babesiasis was made on the basis of the clinical evidence and lesions of severe blood destruction.

DISCUSSION

In canine babesiasis, smears of the organs, especially the lungs, liver, and kidneys, may show the parasites to be more numerous than they are in the peripheral blood.[6] Numerous references have been cited[7] to the blocking of capillaries by agglomerations of parasitized cells, both in malaria and in babesiasis, including canine babesiasis. Aside from the pathogenic significance of such severe parasitism of the

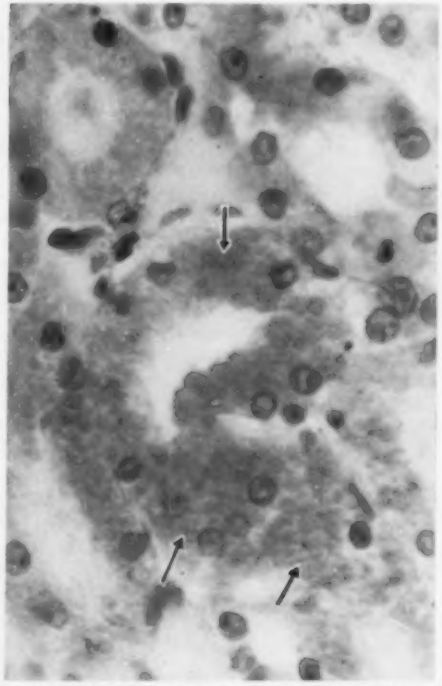

Fig. 2—Kidney of dog 3 showing deposition of hemoglobin in cytoplasm of epithelium (arrows) of proximal convoluted tubule. x 750.

visceral blood, it also seems logical to consider its practical diagnostic significance. The value of histological examination in cases like this is evident. Furthermore, the definite diagnosis of 2 cases from different places in Florida within one year shows that the disease still exists in that area and is probably more prevalent than the sparse reports in the literature would indicate.

SUMMARY

Clinical and pathological findings in 3 cases of babesiasis in dogs are reported. In 2, a definite diagnosis of babesiasis was made on the basis of histological demonstration of *Babesia canis* in erythrocytes within the visceral blood channels. In the third, a presumptive diagnosis of babesiasis was made on the basis of the symptoms and lesions.

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Cortisone Enhances Erysipelas.—Mice and hampsters injected with weak virulent strains of *Erysipelothrix rhusiopathiae* died from the infection when given cortisone for five days, starting the day before infection. The virulence demonstrated was in direct relationship to the quantity of cortisone given. Guinea pigs remained insusceptible.—*Vet. Bull., Sept., 1956.*

Cortisone and Defense Mechanisms.—Animal experiments indicate that cortisone depresses the defenses of the body by depressing (1) the phagocytic activity of reticuloendothelial cells, (2) the total and differential white cell count in the blood, and (3) the *gamma* globulin level in the serum. Its beneficial effects result from depression of the inflammatory reaction and holding in check the cycle of pathological changes. In tenosynovitis or iridocyclitis, it reduces the inflammatory response and prevents formation of adhesions while the infecting organisms can be attacked with antibiotics. Cortisone should be given locally, when possible, to limit the depressing effect on the defense mechanisms.—*Brit. Med. J., Oct. 6, 1956.*

Fatal Impactions of Bovine Omasum

Impaction of the omasum with necrosis of the mucosal folds has long been known as "dry bible" in Tasmania (south of Australia). It occurs as a primary condition, with death in two to six days. Because of the intense pain, the animal generally stands motionless until it falls in convulsions. Necropsy usually reveals nothing but a distended, inflamed, hard omasum, with local peritonitis and necrosis of the mucosa. The rumen lining may be blackened but the abomasum is usually normal. The cause is unknown but it is found chiefly when malnutrition is most evident. —*J. W. Rainey in Vet. Rec., Sept. 22, 1956.*

Chloromycetin, Colostrum, and Calf Scours.—Chloromycetin® was the only antibiotic found, at the University of Wisconsin, to be effective in the treatment of calf scours of the pneumonia-enteritis type, with which newborn calves may die when 2 to 5 days old. Colostrum is effective in preventing this disease but it must be given within one-half hour after birth. Chloromycetin, 500 mg. twice daily to effect, is believed to act on the complicating, toxin-producing bacteria of the intestinal tract and not on the virus. Other antibiotics may aggravate the condition by suppressing the harmless type of bacteria, thus allowing more uninterrupted growth of the harmful organisms.—*Vet. Sci. News, Univ. of Wisconsin, Fall, 1956.*

Melanosarcomas in Equine Animals.—Melanomas, some of which were metastasized, were described in 7 horses (6 gray, 1 brown), a dark brown donkey, 10 years old, and a white mule, 10 years old, which died from pressure of lymph nodes on the tracheal bifurcation.—*Vet. Bull., Oct., 1956.*

[An old gray mare that had been treated for several days for constipation, in 1928, was found on rectal palpation to have her pelvis almost filled with melanomas. She also had several tumors on her tail, especially near the base.—W.A.A.]

Experimental Bloat Studies

Legume bloat was studied, mostly with steers on Ladino clover pasture, at Mississippi Agricultural Experiment Station. While legume bloat is described as being frothy or nonfrothy, only the frothy type was observed on these pastures. Animals that would bloat were used and many bloated twice a day, since they usually grazed for 90 minutes in the morning and again in the afternoon. Bloating usually did not start until they had been on the clover pasture two to three days. A total of 1,575 cases of bloat was observed in 1954, 1,643 in 1955, and 5,000 in 1956 (the yearlings which bloated readily from the first 2 years had been retained).

Antibiotics.—In the first experiment, 50 to 75 mg. of procaine penicillin, given by capsule, would prevent bloat for one to three days. In a second experiment, a larger dose (100 mg.) was more effective. Some other antibiotics also seemed effective. Procaine penicillin incorporated in small amounts of feed, or 50 mg. per ounce of salt, has also been effective.

Detergents.—A limited experiment with one detergent, given by capsule in various doses daily for ten days, did not prevent bloat, and the largest dose (10 Gm.) caused anorexia in 550-lb. steers after three to five days. Single doses up to 30 Gm. gave slight protection but for not more than half a day.

Silicones.—None of the commercial products containing methyl silicone prevented bloat when given up to four times the recommended dose. Pure methyl silicone (20 Gm.) given just before grazing in the morning reduced morning bloat but was ineffective by afternoon. One steer treated twice daily bloated at the first grazing after treatment was discontinued.

Comparison of Different Legumes.—Five legumes grown on similar soils, clipped and fed to steers on drylots, were compared with Ladino clover. Giving Ladino a bloat rating of 100, the bloat index of the others was: white Dutch clover, 64; crimson clover, 7; Persian, 111; red clover, 83; and alfalfa, 108. Switching steers which bloated from one legume to another did not affect the occurrence of bloat.

When 1 to 2 gal. of juice from clover was pumped into the rumen of 2-year-old steers, all bloated in less than 45 minutes. The same steers did not bloat when they were given the same juice in place of the afternoon hay after they had been fed Johnson grass hay instead of grazing for three days. When 2 gal. of juice was pumped into 1 steer which was not bloated after grazing, and into another which was bloated, it had no effect.

The great majority of the bloated steers recovered spontaneously. Of 4,960 cases of bloat in yearlings, in three years, 27 died—about 1 death to every 184 cases of bloat. They died after bloating from 11 to 118 times, the average being 60. There were no fatalities in 2,322 cases of bloat in 2- and 3-year-old steers.

Treatment of bloat with proprietary preparations containing methyl silicone or fatty acids, or by placing a gag in the mouth or chasing the animal, had doubtful effects.

Repeated attempts to relieve legume bloat with a stomach tube were never successful. The tube invariably became plugged regardless of its size. The quantity of lush clover eaten and the rate of eating seemed not to be factors in bloating but the time interval between grazing periods did seem to have an effect. Steers that would bloat regularly on twice-a-day grazings did not bloat at the first grazing when kept off pasture for 24 hours.

The moisture content of the legumes seemed not to be a factor. Steers bloated as readily on clover wilted to 36 per cent moisture as when it contained 75 or 85 per cent moisture, and as readily on short clover in July as on tall, lush clover in April. Rain or dew had no immediate effect, but the intensity of bloat appeared to increase two or three days after a rain when it had been preceded by a dry period.

The authors believe that legume bloat is caused by the predominance of abnormal ruminal microorganisms which increase in relative numbers when the animal has been on legume forage for several days. These organisms seem to be susceptible to certain antibiotics. Some of these organisms seem to produce a "slime" which increases the surface tension and the occurrence of froth. There are other facets of the bloat problem that are difficult to explain.—*Cornell Nutr. Conf., Nov. 8, 1956.*

An Analysis of Rumen Gas.—An approximate analysis of the rumen gas in cows after grazing on alfalfa pasture yielded: carbon dioxide, 66; methane, 26; hydrogen

and nitrogen, 7; and oxygen, less than 1 per cent. Carbon dioxide is one of the end products in the metabolism of carbohydrates. Drenching an animal with sugars results in a rapid increase in carbon dioxide within 90 minutes. Succulent clovers are high in carbohydrate content but a correlation between the carbohydrate content and bloat has not been demonstrated.

Excessive feeding of grain may lower the pH of rumen ingesta to below 6.5. In 2 fatal cases, after grain had been overfed to sheep, the pH was 4.1 and 4.2, respectively. When the pH is less than 5.0, histamine and tyramine appear in the rumen. Animals with a rumen content of 20 μg. of histamine per milliliter were sick but recovered; they died if the histamine exceeded 70 μg. The intravenous injection of histamine inhibited rumen movement and prevented eructation but did not inhibit swallowing.

Adjusting the pH of the rumen, with mineral, acetic, or propionic acids to values of 4.5 or less, reduced or stopped rumen movement for as long as ten hours, but motility was restored as the excess acid was neutralized. If the pH was reduced below 4.0, sheep remained ill for two to seven days. When sheep are overfed on grain, they are subjected to both a lower pH and an excess of histamine. This may also be true with cattle.—*Cornell Nutr. Conf., Nov. 8, 1956.*

Water and Feed Intake of Cattle

The water and feed consumption of cattle are closely related; if one is curtailed the other will be also. A 1,000-lb. animal will consume water as follows: if on maintenance rations, 4 gal. a day if the air temperature is 40 F., 6 gal. if 70 F., and 9 gal. if 90 F.; if gaining the normal 1 lb. per day, 7 gal. at 40 F., 10 gal. at 70 F., and 17 gal. at 90 F.; if a cow milking 35 lb. daily, 14 gal. at 40 F., 18 gal. at 70 F., and 19 at 90 F. (at 90 F., milk production may drop to 25 lb.). A 500-lb. animal will drink 60 per cent, and a 100-lb. animal 20 per cent, as much as a 1,000-lb. animal.—*U.S.D.A., July 24, 1956.*

Rains Wash Minerals Out of Plant Leaves.—When growing plants were sprinkled with water, at Michigan State University, the mineral content of their leaves was reduced. In four hours, poinsettia leaves lost 71 per cent of their potassium salts. Livestock on rain-drenched pastures or fed forage cut soon after heavy rain, may need extra mineral supplement. Several minerals and amino acids were affected.—*Farm J., Feb., 1956.*

Dairy Cattle Feeding Problems

Most dairymen are still feeding horse-and-buggy formulas in jet-age competition. Greater progress has been made in swine and poultry feeding. Over 50 per cent of the veterinary calls on dairy farms in one state last year were for noninfectious diseases such as parturient paresis, ketosis, breeding problems, retained fetal membranes, weak calves, traumatic gastritis and bloat, some of which could have been prevented by better feeds and feeding methods.—*Cornell Nutr. Conf., Nov. 8, 1956.*

Dairy Heifer Nutrition.—For total digestible nutrients or net energy, cane molasses is essentially equal to corn. Growth rates were higher on early-cut hay than on late-cut hay regardless of the supplements used. With the same quality hay, a supplement of urea and corn meal plus molasses was not equal to corn meal, cob meal, and soybean oil meal, or to cane molasses and soybean oil meal.—*Cornell Nutr. Conf., Nov. 8, 1956.*

Recent experiments indicate that the phosphorus requirement of dairy calves, 12 to 18 weeks old, is approximately 0.22 per cent of the air-dried ration.—*Cornell Nutr. Conf., Nov. 8, 1956.*

Growth Inhibitors in Feeds.—Inhibitors of growth and other biological processes in poultry are found in many plant materials and in feeds such as alfalfa meal, cottonseed meal, linseed oil meal, rapeseed oil meal, and soybeans. The inhibitors are largely inactivated in the commercial processing of soybean and cottonseed meals. As used in poultry feeds, the level of alfalfa meal is too low to have an inhibitory effect. A constituent of sweet pea seed (*beta* aminopropionitrile) can be responsible for dissecting aneurisms of the aorta in turkey poults but there has been no evidence of this toxic compound in commercial turkey feeds.—*Cornell Nutr. Conf., Nov. 8, 1956.*

A Phenomenon in Equine Lameness

The value of an accurate diagnosis and the importance of modern diagnostic methods have seldom been better demonstrated than in a recent development with an obscure equine lameness. In recent months, fractures of the fibula are being recognized as the cause of many disappointing performances, past and present, of race horses.

An article entitled "Big Troubles with Little Bones" (*Blood Horse*, Oct. 20, 1956) tells of the light thrown on this vexing problem by Dr. R. L. Lundvall in the JOURNAL (July 1, 1956: 16).

Only 16 weeks after the JOURNAL article was published, *Blood Horse* reported that "small stacks of x-ray pictures showing broken fibulas" had been made, using Dr. Lundvall's technique. One was in a yearling which "simply stood in his tracks" until forced to move. The colt did not again show serious trouble until he was broken. Recent radiographs show one fibula fractured in two places, with the fragment out of position, and a single fracture in the other fibula.

Another was in a trotter, 6 years old, which had lost his form, breaking into a gallop when pressed for speed. The trainer reported that this horse would "trot flat" until he reached a turn, then "he'd try to put his hindfeet in my pockets." Radiographs taken recently, show both fibulas fractured. The horse flinched on manual pressure along his back and would kick when the pressure was gradually increased, as reported by Lundvall.

In this 16-week period, one veterinarian reported that radiographs showed fractured fibulas in 19 horses with this peculiar lameness; another reported more than 25 such cases. (Also *see* page 4 of this issue.)

The several veterinarians mentioned in *Blood Horse* reported little improvement in any horses with demonstrated fibula fractures, but they warned that too little time had elapsed since the condition had been described to always warrant a hopeless prognosis. They recommended prompt diagnosis, complete rest for at least three months, and supplementary feeding of calcium, phosphorus, and vitamins A and D. Dr. C. E. Hagyard, of Lexington, Ky., suggested a cautious prognosis, since over a period of many years he had observed recoveries in many horses which showed stifle lameness that could have been caused by fracture of the fibulas.

Magicians sometimes facetiously credit their wizardry to a "slight twist of the wrist." Seriously, this phenomenon illustrates what can result from a slight twist of an x-ray camera.

The Veterinarian and Mastitis

An editorial, entitled "We're Gaining on Mastitis," in the October *Western Dairy Journal* says some nice things about the educational programs carried on by veterinarians and, at the same time, lends support to what may be the largest single obstacle to successful mastitis prevention and control—namely, over-the-counter sales of antibiotics.

A survey had indicated that 80 per cent of dairymen treated 18.7 per cent of their milking cows for mastitis. Compared to the previous year, 50 per cent thought they had less mastitis, 43 per cent saw no change, and 7 per cent reported more cases.

Most dairymen said they treated mastitis themselves but that most of them bought the products used from their veterinarian. The conclusion was: "Thus, most dairymen are treating their own cows with expert advice."

Is veterinary medicine to be relegated to the position of "expert advice" in combatting mastitis?

Is the veterinarian to function only as a laboratory technician in diagnosis; a mechanical engineer in correcting faulty milking machines; a salesman in dispensing medicaments; and an advisor in educational programs?

If this be the trend, one of the most valuable services of the veterinarian—clinical observation—will be lost and progress in mastitis control will be seriously impeded.

A prediction of the duration and termination of any disease can not be obtained without full information of the individual case as well as a knowledge of the disease generally.

The livestock owner, by also purchasing veterinary service, can and should profit from getting an accurate diagnosis, sound therapy, and an intelligent prognosis—a prognosis based not on drug advertising claims or assumptions but on clinical experience.

Current Literature

ABSTRACTS

Bovine Corpus Luteum and Endometrium in Pregnancy

Histological and histochemical observations of the bovine corpus luteum and endometrium during early pregnancy are described. Some observations were made on the origin of the cells lining the surface of the pregnant uterus and crypts of cotyledons and on the formation of the maternal septums of cotyledons. In contrast to the cyclic corpus luteum at diestrus, the corpus luteum during early pregnancy lacks phosphatase in the lutein tissue. This distribution of alkaline phosphatase and glycogen in the pregnant uterus is similar to that in the uterus prior to and following ovulation.

Destruction of the original surface epithelium of the endometrium is proceded by indentations and apical vacuolization of epithelial cells and thickening of the basement membrane. The newly formed surface epithelium covering the maternal septums of cotyledons seems to be derived entirely from trophoblastic cells other than binucleated giant cells. In intercotyledonary areas, however, where the original surface epithelium was eroded, some binucleated giant cells may participate, in addition to other trophoblastic cells, in the formation of the new surface epithelium. In contrast to the original, the newly formed surface epithelium contains some phosphatase but has no distinct distal border.

Aside from active secretion, some disintegration of whole cells in the superficial glands occurs during pregnancy. Moderate phosphatase activity is present in all glands, even in those basally located. Glycogen is present is superficial glands only. The upper stroma of cotyledonary areas is divided into two layers. The spongy upper layer is more eosinophilic and contains PAS-positive material around individual cells, some of which become enlarged. Only the upper layer seems to be involved in the formation of the walls of the cotyledonary crypts. —[*Samuel Moss, J. F. Sykes, and T. R. Wrenn: Some Observations on the Bovine Corpus Luteum and Endometrium During Early Stages of Pregnancy. Am. J. Vet. Res., 17, (Oct., 1956): 607-614.*]

Flexor Spasm Syndrome in the Carnivore—I, II, III

Literature covering the history of a spasm syndrome occurring in carnivores, and frequently recognized as following distemper, is reviewed (part I). The development of knowledge concerning this syndrome is described. It includes the characteristics of the activity by which the syndrome can be distinguished from "chorea" in man; also, the numerous observations establishing autonomy of the activity within the spinal neural segment independent of the cerebrum; the influence of drugs on the syndrome; and the pathological physiology, which is not yet understood, particularly with regard to appearance of the spasm activity in specific muscle groups.

An instance of flexor spasm syndrome in a tiger (*Felis tigris*) is described (part II). The activity continued during sleep, was diminished by sedatives and abolished by ether, uninfluenced by a single period of artificial hyperpyrexia, markedly increased by thiantoin, and was uninfluenced by tridione. Transection of the spinal cord through a frozen segment was followed by no shock effect on deep reflexes below the section. The effect of the transection upon the flexor spasm syndrome could not be determined in this specimen. Study of the neuraxis revealed abnormalities in cerebral tissue but no changes in this organ or in spinal neuraxis which helped to elucidate localization of the hyperkinesia.

Neuropharmacological and neurosurgical observations of seven specimens manifesting the flexor spasm syndrome, together with observations from other sources since 1862, are summarized (part III).—[*John R. Whittier: Flexor Spasm Syndrome in the Carnivore. I. Review of Its Occurrence in the Literature as "Canine Chorea"; II (with L. J. Goss) Occurrence in a Tiger (Felis Tigris); III Further Observations in Dogs. Am. J. Vet. Res., 17, (Oct., 1956): 720-732.*]

Titrations of Vesicular Stomatitis Virus

New Jersey and Indiana types of bovine vesicular stomatitis virus (VSV) were titrated in tongues of calves and adult cattle, in embryonating chicken eggs, Swiss albino mice, guinea pigs, chicken tongues, and in tissue cultures of guinea pig kidney cells. The 3- to 4-week-old mice, inoculated intracerebrally, and the embryonating chicken eggs were found to be the most sensitive. The tongues of adult cattle and cultured guinea pig kidney cells were of about equal value and came next in order of sensitivity. Calf and chicken tongues gave lower values than the preceding mediums. The guinea pigs gave the lowest values obtained in this survey.

Titrations of suspensions of chorioallantoic membranes infected with the two types of VSV were made in 7- to 10-day-old mice, inoculated intracerebrally and intraperitoneally, and in embryonating chicken eggs. In this limited study, the mice yielded greater $l.d._{50}$ values than the egg with Indiana type VSV, but such difference was not obtained with the New Jersey type.—[*O. N. Fellowes, G. T. Dimopoullos, J. Tessler, W. R. Hess, T. H. Vardaman, and J. J. Callis: Comparative Titrations of Vesicular Stomatitis Virus in Various Animal Species and in Tissue Cultures. Am. J. Vet. Res., 17, (Oct., 1956): 799-802.*]

Diisopropyl Phosphorofluoridate in Rats

The average rate of recovery of red cell cholinesterase activity in female rats given subcutaneous injections of diisopropyl phosphorofluoridate (DFP) in peanut oil was 17 ± 2 per cent per week when 2.25 mg. per kilogram of body weight was

given, and 15±2 per cent per week when 1.75 mg. per kilogram was given. The recovery of red cell cholinesterase activity was not influenced by ovariectomy, by injections of estradiol (0.132 mg. in oil 3 times a week) or progesterone (0.550 mg. in oil 3 times a week) in ovariectomized females, by injections of vitamin B_{12} (10 μg. daily), or by feeding iodinated casein (0.02% of ration). Intraperitoneal blood injections (10 ml. of fresh heparinized rat blood 30 min. after DFP and 5 ml. the next day) resulted in an irregular pattern of recovery of red cell cholinesterase activity, the red cell cholinesterase activity being higher than controls one week after DFP. The normal red cell cholinesterase activity of female rats was about the same as that determined for males in a previous study.

The average rate of recovery of brain cholinesterase activity of female rats given 1.75 mg. per kilogram of DFP was 17.6±2.6 per cent per week from one day through three weeks after DFP, but remained well below normal and showed little further recovery three through six weeks after DFP. The recovery of brain cholinesterase activity was not influenced by blood injections, but appeared to be retarded by iodinated casein feeding. The normal brain cholinesterase activity determined by a constant pH method, was 12.19±1.93 mEq. of hydrogen ions produced per minute by 20 mg. of wet tissue.

Ovariectomized rats given estradiol injections rapidly recovered a normal appearance after DFP, while females given blood injections did not appear to have undergone as great a degree of shock as the others and also recovered a normal appearance rapidly.—[*R. F. Borgman, M. D. Rumbaugh, and G. L. Campbell: The Recovery of Rats Administered Diisopropyl Phosphorofluoridate as Influenced by Female Sex Hormones, Blood Injections, Vitamin B_{12}, and Iodinated Casein. Am. J. Vet. Res., 17, (Oct., 1956): 781-785.*]

Susceptibility of Cortisone-Treated Mice to Escherichia and Salmonella Endotoxins

Weaned mice were found to be more resistant to the effects of the endotoxins of *Escherichia coli* and *Salmonella typhimurium* during cortisone administration and markedly less resistant subsequent to abrupt withdrawal of cortisone. The practical significance of these results in relation to disease production is discussed.—[*T. Moll: The Susceptibility of Weaned Mice to Escherchia Coli and Salmonella Typhimurium Endotoxins During, and Subsequent to, Cortisone Treatment. Am. J. Vet. Res., 17, (Oct., 1956): 786-788.*]

Susceptibility of Cortisone-Treated Mice to Escherichia Coli

Increased blood stream invasion by bacteria from the alimentary and respiratory tracts was observed in mice during, and subsequent to, cortisone treatment. An inverse relationship between the incidence of blood stream invasion from the lung and the incidence of local inflammatory response in the lungs was also observed. The status of adrenal function as a determining factor for invasion by "potentially pathogenic bacteria" is discussed.—[*T. Moll: The Susceptibility of Weaned Mice to Escherichia Coli During, and Subsequent to, Cortisone Treatment. Am. J. Vet. Res., 17, (Oct., 1956): 795-798.*]

Studies of Infectious Synovitis in Chickens

Infectious synovitis has occurred in nearly all the major broiler-producing areas of the United States since it was first recognized in 1954. For broilers, the morbidity has been 1 to 75 per cent, the flock mortality being 0 to 10 per cent. The signs in chickens were pale comb, droopiness, leg weakness, emaciation, breast blisters, and swellings about the joints and tendon sheaths. The lesions were splenomegaly, frequently enlarged and discolored livers, swollen kidneys, and inflammation of the synovial or bursal membranes. Hematologically, the hemoglobin and the erythrocyte counts were lowered, the leukocyte count increased, the percentage of heterophils, moflocytes, and immature leukocytes increased, and the percentage of lymphocytes was decreased.

The agent causing infectious synovitis was isolated from the purulent exudate about the joints and was cultivated in the yolk sac of 5- to 7-day-old embryonating eggs. Certain characteristics of the organism indicated that it was a large particle virus. Embryo lesions were edema, hemorrhages on the skin, enlarged hemorrhagic or mottled livers, and enlarged hemorrhagic kidneys. Chickens were experimentally infected by the following routes: foot pad, hock joint, intravenous, intracranial, intramuscular, sinus, air sac, and by conjunctival instillation. The incubation period in inoculated chickens was two to 20 days and in contact controls it was 25 to 80 days.

Turkeys were susceptible to the synovitis virus but rabbits, mice, rats, pigs, and sheep were not. Hatchery transmission was suspected but could not be verified experimentally.—[*N. O. Olson, D. C. Shelton, J. K. Bletner, D. A. Munro, and G. C. Anderson: Studies of Infectious Synovitis in Chickens. Am. J. Vet. Res., 17, (Oct., 1956): 747-754.*]

Hemorrhagic Syndrome in Chickens Fed Sulfaquinoxaline

A hemorrhagic syndrome was produced in young chickens by adding 0.05 per cent and 0.15 per cent sulfaquinoxaline to a ration fortified with vitamin K and alfalfa. Control birds on the same ration without sulfaquinoxaline did not show the condition.

Histopathological studies of tissues from 4 sick birds which received 0.1 per cent sulfaquinoxaline revealed hypoplastic bone marrow with focal necrosis and karyorrhexis. Petechial hemorrhages were present in the skeletal muscles and myocardium along with focal myocarditis and hyaline degeneration. The spleen contained many areas of focal necrosis. Kidney lesions included necrobiosis of renal epithelium, tubular casts, and hemorrhage. Lesions in the brain stem included neuronal de-

generation, neuronophagia, and focal gliosis. Edema and thrombosis were present in the lungs. Petechial hemorrhages were present in the wall of the small intestine and proventriculus. There was evidence of earlier enteritis.

A similarity of lesions was observed in the sulfaquinoxaline-treated birds, in naturally occurring field cases of hemorrhagic disease in chickens, and in drug allergies in man. Over 50 drugs that will produce an acute reaction in man are known. A wide variety of drugs are currently being used in the treatment of poultry diseases and some of these could conceivably produce similar reactions in chickens. It is suggested that many cases of hemorrhagic disease in chickens are due to drug allergy. —[*V. L. Sanger, H. Yacowitz, and E. N. Moore: Micropathological Changes in an Hemorrhagic Syndrome in Chickens Fed Sulfaquinoxaline and Suggested Cause of the Disease. Am. J. Vet. Res., 17, (Oct., 1956): 766-770.*]

Application of Freeze-Agglutination to Chronic Respiratory Disease of Chickens

A new serological technique, freeze-agglutination (FA), has been developed to detect birds infected with pleuropneumonia-like organisms (PPLO). The test is conducted as follows: Serum is delivered into capillary tubes and is frozen. A PPLO antigen, grown in a modified Difco PPLO medium and concentrated, is subsequently delivered into the tubes adjacent to the serum and the tubes are incubated horizontally for five minutes at 37 C. The layered serum and antigen are then frozen horizontally, thawed in a horizontal position at 37 C., rotated to the vertical, slowly inverted, rotated to an upright position, and examined for the presence or absence of clumping. Serums producing no clumped material are regarded as negative and serums producing clumped material are regarded as positive for PPLO.

Data obtained as a result of comparing the FA test with the hemagglutination-inhibition and the macroscopic tube-agglutination tests indicate that, under the conditions of this experiment, the FA test is relatively specific, sensitive, and comparatively economical to run. Preliminary evidence indicates that suitable modifications of the test will also be useful in other antigen-antibody complexes. —[*C. H. Domermuth and E. P. Johnson: A New Serological Technique—Freeze-Agglutination. I. Applications to Chronic Respiratory Disease of Chickens. Am. J. Vet. Res., 17, (Oct., 1956): 778-780.*]

FOREIGN ABSTRACTS

Intestinal Trichomoniasis of Pheasants

During 1955, several outbreaks of acute disease were observed in 15-day-old pheasants. The course of the disease was short; the symptoms were lassitude, diarrhea, loss of equilibrium, and death in 24 hours or less.

Bacteriological examination of the internal organs was negative. The intestines showed catarrhal enteritis and little fecal material was present. The intestinal tract anterior to the cecums contained a milky fluid which was rich in trichomonads. The species differed in many respects to these previously described and has been named *Trichomonas phasiani.* Treatment with 0.05 Gm. per kilogram of body weight of the sodium salt of bis-(p arsonophenylamino)1-2 ethane was spectacularily successful. This drug has been used in human intestinal trichomoniasis and was supplied by the firm of Specia.—[*A. Lucas, L. Toucas, Intestinal Trichomoniasis of Pheasants. Rec. méd. vét. d'Alfort, 132, (1956): 613-617.*]—J. P. SCOTT.

Psittacosis-Lymphogranuloma in Japan

Pneumonia in goats imported from the United States was found to be due to a virus of the psittacosis-lymphogranuloma group. Infection is caused by intradermal inoculation and by inhalation of finely dispersed virus. Diagnosis is confirmed by complement-fixation tests. This virus is readily cultivated in the chicken embryo.

Viruses of this group have been isolated from cattle affected with encephalitis and pneumonia, and also from the feces of goats and cattle showing no clinical symptoms. An epidemic of psittacosis in birds has also been studied.

Mammals debilitated following transport, crowding, or other conditions are especially susceptible to this virus. Peritonitis, mastitis, and endometritis may be produced by this agent.

Treatment with antibiotics has been successful. Achromycin in doses of 7 mg. per kilogram of body weight, three times a day for ten days, completely eliminated the virus from the feces of treated goats.—[*T. Omori, S. Ishii, and M. Matsumoto: Infections Due to the Psittacosis-Lymphogranuloma Group in Japan. Off. Internat. des Epizoot., 46, (1956): 153-169.*]—J. P. SCOTT.

Crystal Violet Vaccine Controls Hog Cholera in Germany

Hog cholera lends itself to a rigorous stamping out campaign.

In the East German Democratic Republic, hog cholera had been widespread. Since 1953, a rigorous process of compulsory vaccination with crystal violet vaccine, slaughter, and quarantine has been carried out. Total vaccination and strict sanitary control has eliminated hog cholera. No infected premises have been reported since June, 1954.—[*H. Rober: Specific Prophylaxis Against Hog Cholera by the Use of Crystal Violet Vaccine. Off. Internat. des Epizoot., 46, (1956): 329-334.*]—J. P. SCOTT.

Histomoniasis in the Partridge

Histomoniasis is caused by the flagellate, *Histomonas meleagridis.* Similar lesions have been produced by molds of the genus, Blastomyces, and by *Trichomonas gallinarum.*

Histomoniasis, previously considered as a disease of turkeys only, has been observed in chickens

and wild birds (grouse, quail, guinea hens, and peacocks). The parasite multiplies in the cecums of infected birds and is transmitted by the droppings during the acute stage of the disease and from recovered carrier birds. A second method of transmission is by means of infected eggs of Heterakis, in which state the parasite is extremely resistant.

Keeping each species of fowl strictly isolated helps prevent infection. Treatment with tryparsamide and, more recently, with 2-amino-nitrothiazole or bis-(p-arsonophenylamino)-1-2 ethane, 0.05 Gm. per kilogram of live weight in the drinking water for 15 days and repeated after 15 days, was beneficial.—[*P. Lucas, L. Toucas, M. Laroche, and L. Monin: Histomoniasis in the Partridge. Rec. méd vét. Alfort, 132, (1956): 527-531.*]—J. P. SCOTT.

Another New Latin American Veterinary Journal

The first issue (vol. 1, No. 1) of the *Revista Veterinaria Venezolana,* a Spanish language monthly, was dated August, 1956. The publisher is the National Association of Veterinary Medicine, Caracas, Venezuela. As stated in a foreword, the purpose of this *Revista* is to report scientific research, new techniques, and new methods (and their practical application) of veterinarians in Venezuela and its surrounding territories. In addition to original articles, abstracts and translations from other periodicals will be published, as well as news of the profession.

One of the founders, Dr. Carlos Ruiz Martinez, is the editor, and correspondence may be addressed to him at: Quinta Marilina, Avenida La Vega, Calle Stolk, El Paraiso, Caracas. The subscription price is 25 Bs. or $7.50 per year.

BOOKS AND REPORTS

Diseases of Cattle

This new text on bovine diseases and problems includes one or more chapters by each of 57 authors and ranges in subject matter from "abomasotomy" to "yeast mastitis." Each author has apparently been given a free hand in discussing the assigned subjects. The result is a book which represents many refreshingly independent points of view. However, this sometimes results in a lack of uniformity in the method of discussion which somewhat detracts from the excellence of the text.

Most chapters are well organized and clearly presented, but a few suffer from incompleteness or from lack of clarity. In a few instances, the author seems not to be familiar with certain limited phases of his subject. For instance, the discussion (under nervous diseases) or cornstalk poisoning errs in stating that "the symptoms resemble those of prussic acid poisoning" (there is hysteria but no dyspnea); also, the lesions described are scarcely typical of the disease (the liver is usually cyanotic, the thymus beautifully petechiated) as it existed in the corn belt in the 1930's, before it became a rarity. However, the term "cornstalk disease" is sometimes applied to a variety of conditions, including nitrate poisoning, when they are associated in any way with cornstalks.

The lack of a more clear differentiation between actinomycosis and actinobacillosis is disappointing; also, the indicated relative prevalence of the soft tissue and bony types is apparently at considerable variance with that in many other regions. Readers may question the inclusion, under bacterial diseases and without laboratory confirmation, of a condition referred to as "hemorrhagic septicemia complex" which, as described, would seem to be an enzootic condition with characteristics sufficiently variable as to cause doubt that it is due to a single agent.

Aside from a few such defects, this text is an outstanding contribution to veterinary literature, since it compiles interesting and valuable information on a wide variety of the common ills of the most important livestock species. No veterinarian dealing with cattle or bovine products should be without this text.—[*Diseases of Cattle. By fifty-seven authors. 752 pages. Well illustrated. American Veterinary Publications, Inc., Evanston, Ill. Price $16.*]—W. A. AITKEN.

Parasitic Mites of Medical or Economic Importance

The authors, from the U. S. Department of Agriculture, U. S. Army, and U. S. Navy, have presented a simple, precise, workable manual of the important mite parasites of man and domestic animals. The manual contains keys; plates with more than 100 detailed figures; discussions on the importance of each species with its description, life cycle, and control; and references. It has been written for use as a practical guide by acarologists, entomologists, public health workers, dermatologists, and pest control operators. The manual is also a handy reference for veterinarians.—[*A Manual of Parasitic Mites of Medical or Economic Importance. By E. W. Baker, T. M. Evans, D. J. Gould, W. B. Hull, and H. L. Keegan. 170 pages. National Pest Control Association, Inc., 30 Church St., New York 7, N. Y. 1956. Price $4.25 postpaid.*]—J. L. HOURRIGAN

Dictionary of Poisons

Substances poisonous to man are listed alphabetically, with the symptoms, antidotes, and first aid measures for each. The book is designed as a handy reference for anyone dealing with poisoning in human beings.—[*Dictionary of Poisons. By Ibert and Eleanor Mellan. 150 pages. Philosophical Library, New York, N. Y. 1956. Price $4.75.*]

Moving?

Send your change of address to the JOURNAL of the American Veterinary Medical Association, 600 S. Michigan Ave., Chicago 5, Ill.

THE NEWS

U. S. GOVERNMENT

Dr. Winter in Charge of Michigan Disease Eradication Activities.—Dr. Asa Winter has been appointed veterinarian in charge of the animal disease eradication activities for the U.S. Department of Agriculture in Lansing, Mich. In his new assignment, Dr. Winter has supervision of state-federal cooperative disease eradication activities in the state.

Dr. Asa Winter

Born in Michigan, Dr. Winter received the D.V.M. degree from Michigan State University in 1921. He has engaged in U.S.D.A. tuberculosis and brucellosis eradication and field calf vaccination activities since 1925, except for the period 1944-1948 when he was assistant director of the New York BAI. Since 1954, Dr. Winter has been assistant to the chief of the Animal Disease Eradication Branch, ARS, in Washington, D.C.

AMONG THE STATES AND PROVINCES

Georgia

Dr. Edwards Receives Research Award.—Dr. Philip R. Edwards, honorary member of the AVMA, received the 1956 Kimble Methodology Research Award at the annual conference of state and provincial public health laboratory directors held on Nov. 12, 1956, at the Ambassador Hotel in Atlantic City, N. J.

The award, sponsored by Kimble Glass Co. and given to those who contribute better methods of procedure in the field of public health, was presented to Dr. Edwards for the development of techniques which make it possible to more quickly and accurately identify the bacteria causing various enteric disorders.

Dr. Edwards is in charge of the Enteric Bacteriology Unit, Communicable Disease Center, U.S. Public Health Service, Chamblee, Ga.

Massachusetts

State Association.—At a meeting of the Massachusetts Veterinary Association on Nov. 21, 1956, at the Hotel Beaconsfield, Brookline, Dale G. Friend, M.D., Harvard University, Cambridge, discussed the uses and abuses of certain drugs.

s/C. LAWRENCE BLAKELY, *Secretary.*

Wyoming

State Association.—At the Nov. 11, 1956, meeting of the Wyoming Veterinary Medical Association, A. D. Rankin, E. R. Squibb and Sons, Brooklyn, N.Y., discussed hormones; Harold Breen, Wyoming State Veterinary Laboratory, reported on anthrax outbreaks; and V. J. Humphreys, Worland, discussed practical aids presented at the Ninety-Third Annual Meeting of the AVMA, San Antonio, Texas.

s/J. F. RYFF, *Secretary.*

STATE BOARD EXAMINATIONS

Arizona—The Arizona State Board of Veterinary Medical Examiners will hold veterinary licensing examinations on Jan. 16-17, 1957, in Phoenix. Requests for applications and additional information should be addressed to Dr. E. R. Hinshaw, secretary, 408 Arizona State Building, Phoenix, Ariz.

DEATHS

★**Ellery M. Aldrich** (UP '13), 68, Belmont, Mass., died on Nov. 8, 1956. Born at New Milford, Pa., in 1888, he received his early education in local schools and at the Rochester Business Institute. Dr. Aldrich was for many years employed by the Bureau of Animal Industry, U.S.D.A., and served for a number of years as federal veterinarian in charge of Massachusetts. He retired from this work over a year ago.

Dr. Aldrich was a member of the local and state veterinary associations, also of the AVMA which he joined in 1918. In 1946, he served as chairman of the committee on local arrangements for the eighty-third annual AVMA convention in Boston.

★Indicates members of the AVMA.

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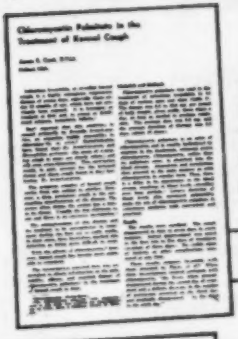

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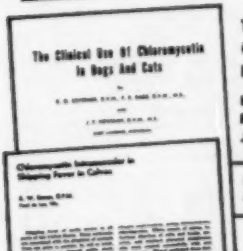

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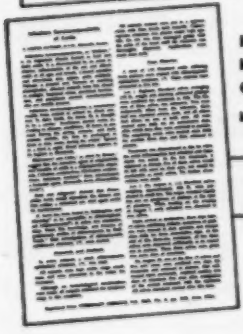

INFECTIONAL KERATOCONJUNCTIVITIS OF CATTLE

by S. Lester Jackson, D.V.M.

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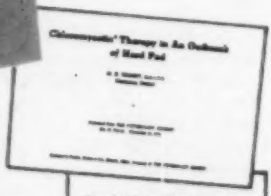
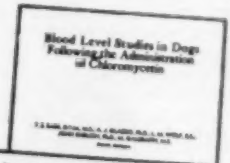
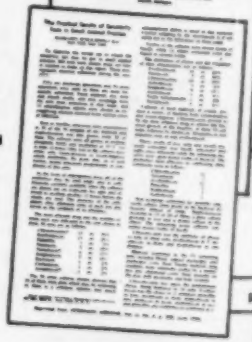


CHLOROMYCETIN THERAPY IN AN OUTBREAK OF HARD PAD

by M. B. Toosey, M.R.C.V.S.

Reprint from *The Veterinary Record*





BLOOD LEVEL STUDIES IN DOGS FOLLOWING THE ADMINISTRATION OF CHLOROMYCETIN

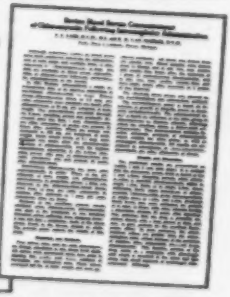
by F. E. Eads, D.V.M., M.S.; A. J. Glazko, Ph.D.; L. M. Wolf, B.S.; John Ehrlich, Ph.D.; M. Galbraith, M.S.

Reprint from the *American Journal of Veterinary Research*

THE PRACTICAL RESULTS OF SENSITIVITY TESTS IN SMALL ANIMAL PRACTICE

by Margaret Schlichting, B.A.

Reprint from *Veterinary Medicine*



BOVINE BLOOD SERUM CONCENTRATIONS OF CHLOROMYCETIN FOLLOWING INTRAMUSCULAR ADMINISTRATION

by F. E. Eads, D.V.M., M.S. and K. D. Van Hooker, D.V.M.

Reprint from *The California Veterinarian*

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ORGANIZATION SECTION

Questions and Answers on Social Security

Question—Dr. Blue, a veterinarian, is in partnership with his wife who is not a veterinarian.

a) Is Dr. Blue covered under Social Security? If so, when does coverage begin, and when does he pay the self-employment tax?

b) Is Dr. Blue's wife also covered under Social Security? What benefits will she be entitled to receive under the Old Age and Survivors Insurance Program?

Answer—(*a*) Dr. Blue is covered under Social Security. On Aug. 1, 1956, the President approved H. R. 7225, the Social Security Amendments of 1956. The new law extends old age and survivors insurance coverage, effective with respect to taxable years ending after 1955, to self-employed veterinarians, dentists, osteopaths, naturopaths, chiropractors, and optometrists. Dr. Blue will pay a self-employment tax of 3 per cent on the first $4,200 of net earnings from self-employment at the time he files his income tax return for the year 1956.

b) Dr. Blue's wife is also covered under Social Security. The rules which apply to income derived from the practice of a profession by an individual veterinarian apply equally to such practice when engaged in by a partnership. It is the practice of the partnership which is the controlling factor. Therefore, where the partnership holds itself out to the public as veterinarians and one or more of the partners is not a veterinarian, the distributive share of income of all of the partners is included in their net earnings from self-employment, even though one of the partners may not have professional status or perform professional services.

Dr. Blue and his wife should file a partnership informational return and they should each file a separate Schedule SE which is part of their income tax return. Dr. Blue's wife will be eligible for benefits based on her average monthly earnings which she may claim as early as age 62 at a reduced rate. When she files a claim, she will be entitled to receive a benefit based on her own account or her husband's account, whichever is greater. She, too, should complete an application for a Social Security account number.

APPLICATIONS

Applicants—Members of Constituent Associations

In accordance with paragraph (b) of Section 2, Article X, of the Administrative Bylaws, as revised at the annual meeting of the House of Representatives, Aug. 18, 1951, in Milwaukee, Wis., the names of applicants residing within the jurisdictional limits of the constituent associations shall be published once in the JOURNAL.

The following applicants have been certified as members of the constituent association that has jurisdiction over the area in which the applicant resides. The certification was made by the secretary of the constituent association in accordance with Section 2, Article X, of the Administrative Bylaws.

CARLSON, KENNETH C.
6400 S.E. 15th, Oklahoma City, Okla.
D.V.M., Kansas State College, 1945.

GROVE, MELVIN N.
97 Prospect St., Stamford, Conn.
D.V.M., Middlesex University, 1944, and National Veterinary College of Alfort, 1950.

SEIDE, SAUL H.
P.O. Box 460, Front Royal, Va.
D.V.M., Middlesex University, 1944.

THORSON, THAD
10291 Garden Grove Blvd., Garden Grove, Calif.
D.V.M., Ohio State University, 1949.

VICKERS, FRANCIS G.
4905 Calhoun Rd., Live Stock Exchange Bldg., Houston, Texas.
D.V.M., Alabama Polytechnic Institute, 1944.

WAGUESPACK, MOISE A., JR.
Taft, La.
D.V.M., Texas A. & M. College, 1955.

WINKEL, J. B.
Hi-Way 169, Algona, Iowa.
D.V.M., Iowa State College, 1932.

Applicants—Not Members of Constituent Associations

In accordance with paragraph (b) of Section 2, Article X, of the Administrative Bylaws, as revised at the annual meeting of the House of Representatives, Aug. 18, 1951, in Milwaukee, Wis., notice of all applications from applicants residing outside of the jurisdictional limits of the constituent associations, and members of the Armed Forces, shall be published in the JOURNAL for two successive months. The first notice shall give the applicant's full name, school, and year of graduation, post office address, and the names of his endorsers.

First Listing

ECKERMANN, EDGAR H.
11th Field Hospital, APO 178, New York, N Y.
D.V.M., Texas A. & M. College, 1952.
Vouchers: W. E. Jennings and W. M. Vansell.

Second Listing

MORAN, GUY G., 822 Rigsby, San Antonio, Texas.

REYES, JULIO, Col. Amer. E-17, N. Rosita, Coahvila, Mexico.

SCHROEDER, GERALD F., Box 187, Amenia, N. Y.

UPHAM, ROY W., 9927th TU MDHS., 1819 W. Pershing Rd., Chicago, Ill.

ZIEROLD, PABLO, Apdo Postal 32, Tlalnepantla, Mexico.

Graduate Applicants

The following are graduates who have recently received their veterinary degree and who have applied for AVMA membership under the provision granted in the Administrative Bylaws to members in good standing of student chapters. Applications from this year's senior classes not received in time for listing this month will appear in later issues. An asterisk (*) after the name of a school indicates that all of this year's graduates have made application for membership.

First Listing

Michigan State University

GIBSON, JOHN G., D.V.M.

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NEW! the improved Frank's Fetal Extractor

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NEW! Copon kennel paint refinishes rusty kennels

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Baked black enamel over steel with brass trim. 5 standard models; light weight yet built to take knocks! See folder N-1 for sizes, prices. Most are in stock, ready to ship.

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NEW! clear plastic cases for your glass syringes

Keep syringes sterile, clean in these light unbreakable plastic cases. Covers for 5, 10 and 20 cc. syringes, $5.75 set, folder N-4 gives details.

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- ☐ folder N-2 Plasti-Plate
- ☐ folder N-3 "B" irons
- ☐ folder N-4 syringe cases
- ☐ folder N-5 sign letters
- ☐ folder N-6 firing irons
- ☐ folder N-F extractor
- ☐ folder N-R radiant panel
- ☐ folder N-C COPON paint

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Second Listing

University of California

CONNOLLY, ROBERT J., D.V.M., 243 Roan Dr., Eugene, Ore.

Colorado A. & M. College

HAWLEY, JOHN F., D.V.M., P.O. Box 769, Chadron, Neb.
KEISS, CHARLES W., D.V.M., Rt. 3, Grand Island, Neb.

Ontario Veterinary College

MOSZKOWSKI, VICKI, D.V.M., 2172 McKenzie Pl., Niagara Falls, Ont.

COMING MEETINGS

New York State Veterinary College. Annual conference for veterinarians. New York State Veterinary College, Cornell University, Ithaca, Jan. 2-4, 1957, W. A. Hagan, dean.

Pennsylvania, University of. Annual conference for veterinarians. School of Veterinary Medicine, 39th St. and Woodland Ave., Philadelphia, Pa., Jan. 8-9, 1957. M. W. Allam, dean.

Wisconsin Veterinary Medical Association. Annual meeting. Schroeder Hotel, Milwaukee, Jan. 9-11, 1957. B. A. Beach, 1215 Vilas Ave., Madison, Wis., secretary.

Tennessee Veterinary Medical Association. Annual meeting. Memphis, Tenn., Jan. 13-15, 1957. H. W. Hayes, 5009 Clinton Pike, Knoxville, secretary.

Oklahoma Veterinary Medical Association. Annual meeting. Huckins Hotel, Oklahoma City, Jan. 13-15, 1957. M. N. Riemenschneider, 122 State Capitol Building, Oklahoma City, secretary.

Indiana Veterinary Medical Association. Annual meeting. Hotel Severin, Indianapolis, Jan. 16-18, 1957. L. M. Borst, 3315 Shelby, Indianapolis, Ind., secretary.

Michigan State University. Conference for veterinarians. College of Veterinary Medicine, East Lansing, Jan. 22-23, 1957. C. F. Clark, dean.

Iowa Veterinary Medical Association. Annual meeting. Hotel Fort Des Moines, Iowa, Jan. 22-24, 1957. F. B. Young, Waukee, Iowa, secretary.

North Carolina State College. Conference for veterinarians. North Carolina State College, Raleigh, Jan. 22-25, 1957. C. D. Grinnells, chairman.

Maryland State Veterinary Medical Association. Annual meeting. Lord Baltimore Hotel, Baltimore, Jan. 23-24, 1957. John D. Gadd, Cockeysville, Md., secretary.

Intermountain Veterinary Medical Association. Twenty-ninth annual meeting. Hotel Utah, Salt Lake City, Utah, Jan. 24-26, 1957. R. A. Bagley, 2387 East 39th South St., Salt Lake City, Utah, secretary.

Virginia Veterinary Medical Association. Annual meeting. Hotel John Marshall, Richmond, Va., Jan. 27-29, 1957. W. B. Bell, 1303 Hillcrest Dr., Blacksburg, secretary.

California State Veterinary Medical Association. Midwinter conference. School of Veterinary Medicine, University of California, Davis, Jan. 28-30, 1957. Charles S. Travers, 3004 16th St., San Francisco, executive secretary.

Louisiana State University. Conference for veterinarians. Pleasant Hall, Louisiana State University, Baton Rouge, Jan. 29-30, 1957. W. T. Oglesby, head, Department of Veterinary Science.

Minnesota State Veterinary Medical Association. Annual meeting. Radisson Hotel, Minneapolis, Feb. 4-6, 1957. B. S. Pomeroy, 1443 Raymond Ave., St. Paul 8, secretary.

Kansas Veterinary Medical Association. Annual meeting. Lamer Hotel, Salina, Feb. 6-8, 1957. K. Maynard Curts, 5236 Delmar Ave., Kansas City 3, Kan., secretary.

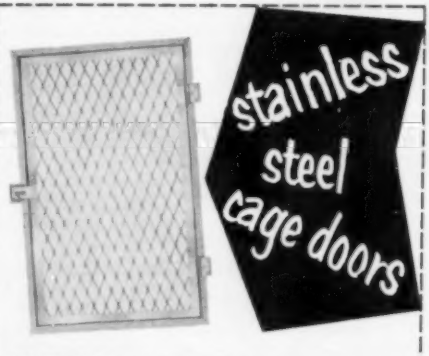
New Jersey, Veterinary Medical Association of. Annual meeting. Berkeley Carteret Hotel, Asbury Park, Feb. 13-14, 1957. J. R. Porteus, P. O. Box 938, Trenton 5, N. J., resident secretary.

Nevada State Veterinary Association. Annual meeting. Ranch Inn, Elko, Feb. 15-16, 1957. W. F. Fisher, 1465 Wells Ave., Reno, Nev., secretary.

Illinois State Veterinary Medical Association. Annual convention. La Salle Hotel, Chicago, Feb. 25-27, 1957. C. B. Hostetler, 1385 Whitcomb Ave., Des Plaines, Ill., executive secretary.

Texas A. & M. College. Conference for veterinarians. Texas A. & M. College, College Station, June 6-7, 1957. R. D. Turk, chairman.

Washington State College. Annual conference for veterinarians. College of Veterinary Medicine, Washington State College, Pullman, April 8-10, 1957. John R. Gorham, chairman.



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NOTICE

Veterinarians attending the California State Midwinter Conference, Jan. 28-30, 1957, who wish to employ junior students for work the following summer, may register at a booth provided by the California Student Chapter during the Conference.

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Regularly Scheduled Meetings

ALABAMA—Central Alabama Veterinary Association, the first Thursday of each month. B. M. Lauderdale, Montgomery, secretary.

Jefferson County Veterinary Medical Association, the second Thursday of each month. S. A. Price, 213 N. 15th St., Birmingham, secretary.

Mobile-Baldwin Veterinary Medical Association, the first Tuesday of each month. W. David Gross, 771 Holcombe Ave., Mobile, Ala., secretary.

ARIZONA—Central Arizona Veterinary Medical Association, the second Tuesday of each month. Keith T. Maddy, Phoenix, Ariz., secretary.

Southern Arizona Veterinary Medical Association, the third Wednesday of each month at 7:30 p.m. E. T. Anderson, Rt. 2. Box 697, Tucson, Ariz., secretary.

CALIFORNIA—Alameda Contra Costa Veterinary Medical Association, last Wednesday of each month. Leo Goldston, 3793 Broadway, Oakland 11, Calif., secretary.

Bay Counties Veterinary Medical Association, the second Tuesday of each month. E. Paul, Redwood City, Calif., secretary.

Central California Veterinary Medical Association, the fourth Tuesday of each month. R. B. Barsaleau, 2333 E. Mineral King, Visalia, Calif., secretary.

Kern County Veterinary Medical Association, the first Thursday evening of each month. A. L. Irwin, 301 Taft Highway, Bakersfield, Calif., secretary.

Mid-Coast Veterinary Medical Association, the first Thursday of every even month. W. H. Rockey, P. O. Box 121, San Luis Obispo, Calif., secretary.

Monterey Bay Area Veterinary Medical Association, the third Wednesday of each month. Lewis J. Campbell, 90 Corral de Tierra, Salinas, Calif., secretary.

North San Joaquin Valley Veterinary Medical Association, the fourth Wednesday of each month at the Hotel Covell, in Modesto, Calif. Lyle A. Baker, Turlock, Calif., secretary.

Orange Belt Veterinary Medical Association, the second Monday of each month. Chester A. Maeda, 766 E. Highland Ave., San Bernardino, Calif., secretary.

Orange County Veterinary Medical Association, the third Thursday of each month. Donald E. Lind, 2643 N. Main St., Santa Ana, Calif., secretary.

Peninsula Veterinary Medical Association, the third Monday of each month. T. D. Harris, San Mateo, Calif., secretary.

Redwood Empire Veterinary Medical Association, the third Thursday of each month. Robert E. Clark, Napa, Calif., secretary.

Sacramento Valley Veterinary Medical Association, the second Wednesday of each month. W. E. Steinmetz, 4227 Freeport Blvd., Sacramento, Calif., secretary.

San Diego County Veterinary Medical Association, the fourth Tuesday of each month. H. R. Rossoll, 1795 Moore St., San Diego, Calif., secretary.

San Fernando Valley Veterinary Medical Association, the second Friday of each month at the Casa Escobar Restaurant in Studio City. John Chudacoff, 7912 Sepulveda Blvd., Van Nuys, secretary.

Southern California Veterinary Medical Association, the last Wednesday of each month. Don Mahan, 1919 Wilshire Blvd., Los Angeles 57, Calif., executive secretary.

Tulare County Veterinarians, the second Thursday of each month. R. B. Barsaleau, 2333 E. Mineral King, Visalia, Calif., secretary.

COLORADO—Denver Area Veterinary Society, the fourth Tuesday of every month. Richard C. Tolley, 5060 S. Broadway St., Englewood, Colo., secretary.

Northern Colorado Veterinary Medical Society, the first Monday of each month. M. A. Hammarlund, School of Veterinary Medicine, Colorado A. & M. College, Fort Collins, Colo., secretary.

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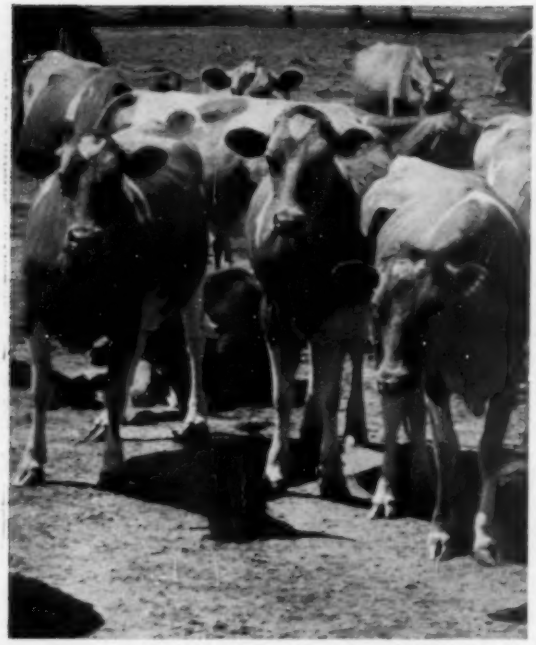

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References: 1. Agricultural Research Service, Losses in Agriculture, June, 1954. Table 20, p. 129. 2. Brown, A. L., et al.: Vet. Med. 50:167, April, 1955.

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VETERINARY DEPARTMENT, U. S. VETERINARY LICENSE NO. 3

DELAWARE—New Castle County Veterinary Association, the first Tuesday of each month at 9:00 p.m. in the Hotel Rodney, Wilmington, Del. E. J. Hathaway, Clifton Park Manor, Apt. 73-5, Wilmington 2, Del., secretary.

FLORIDA—Central Florida Veterinary Medical Association, the second Friday of each month, time and place specified monthly. James B. Murphy, Eustis, Fla., secretary.

Jacksonville Veterinary Medical Association, the second Thursday of each month, time and place specified monthly. George F. Yopp, 4644 Main St., Jacksonville, Fla., secretary.

Northwest Florida Veterinary Medical Society, third Wednesday of each month, time and place specified monthly. Harold A. Tennant, Atmore, Ala., secretary.

Palm Beach Veterinary Society, the last Thursday of each month in the county office building at 810 Datura St., West Palm Beach. Ross E. Evans, 5215 S. Dixie Highway, West Palm Beach, Fla., secretary.

Ridge Veterinary Medical Association, the fourth Thursday of each month in Bartow, Fla. Paul J. Myers, Winter Haven, Fla., secretary.

South Florida Veterinary Society, the third Tuesday of each month, at the Seven Seas Restaurant, Miami, Fla. E. D. Stoddard, 6432 S. W. 8th St., Miami, Fla., secretary.

Suwannee Valley Veterinary Association, the third Friday of each month, at the Thomas Hotel, Gainesville, Fla. R. C. Mann, Rt. 1, Box 37, Ocala, Fla., secretary.

Volusia County Veterinary Medical Association, the fourth Thursday of each month. A. E. Hixon, 131 Mary St., Daytona Beach, Fla., secretary.

GEORGIA—Atlanta Veterinary Society, the second Tuesday of every month at the Elks Home on Peachtree St., Atlanta, Ga. J. L. Christopher, Smyrna, Ga., secretary.

ILLINOIS—Chicago Veterinary Medical Association, the second Tuesday of each month. Mark E. Davenport, Jr., 215 S. Edgewood Ave., LaGrange, Ill., secretary.

Eastern Illinois Veterinary Medical Association, the first Thursday of March, June, September, and December. A one-day clinic is held in May. H. S. Bryan, College of Veterinary Medicine, University of Illinois, Urbana, secretary.

INDIANA—Central Indiana Veterinary Medical Association, the second Wednesday of each month. Peter Johnson, Jr., 4410 N. Keystone Ave., Indianapolis 5, secretary.

Michiana Veterinary Medical Association, the second Thursday of every month except July and December, at the Hotel LaSalle, South Bend, Ind. J. M. Carter, 3421 S. Main St., Elkhart, Ind., secretary.

Tenth District Veterinary Medical Association, the third Thursday of each month. W. E. Sharp, Union City, Ind., secretary.

IOWA—Cedar Valley Veterinary Association, the second Monday of each month, except January, July, August, and October, at Black's Tea Room, Waterloo, Iowa. H. V. Henderson, Reinbeck, Iowa, secretary.

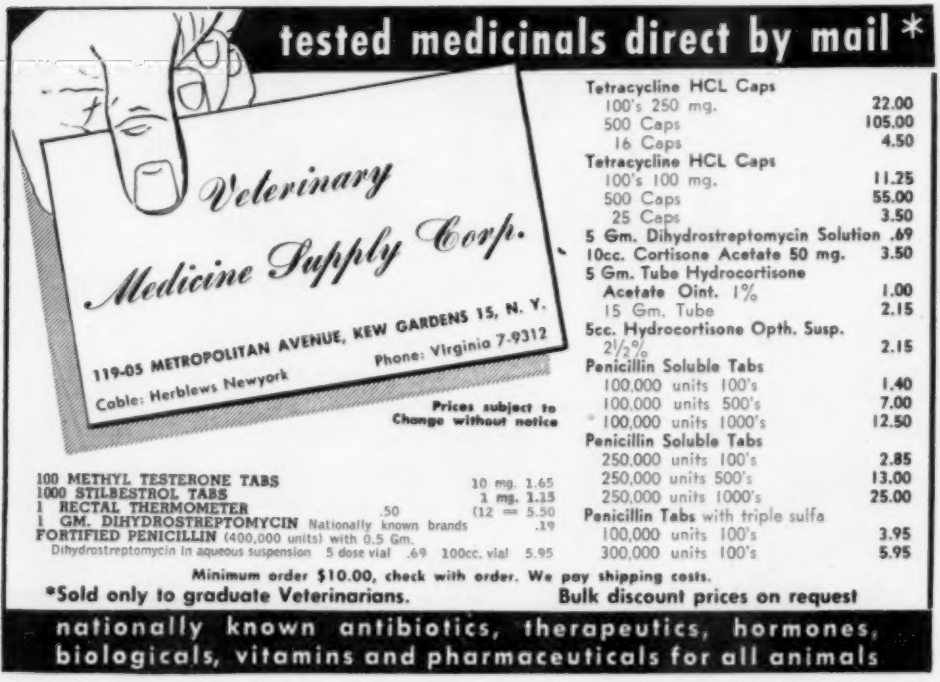
Coon Valley Veterinary Association, the second Wednesday of each month, September through May, at the Bradford Hotel, Storm Lake, Iowa. D. I. Lee, Sac City, Iowa, secretary.

Fayette County Veterinary Association, the third Tuesday of each month, except in July and August, at Pa and Ma's Restaurant, West Union, Iowa. Donald E. Moore, Box 178, Decorah, Iowa, secretary.

Northeast Iowa-Southern Minnesota Veterinary Association, the first Tuesday of February, May, August, and November at the Wisneslick Hotel, Decorah, Iowa, 6:30 p.m. Donald E. Moore, Box 178, Decorah, Iowa, secretary.

KENTUCKY—Central Kentucky Veterinary Medical Association, the first Wednesday of each month. L. S. Shirrell, Versailles Rd., Frankfort, secretary.

Jefferson County Veterinary Society of Kentucky, Inc., the first Wednesday evening of each month in Louisville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100,000 units 1000's 12.50
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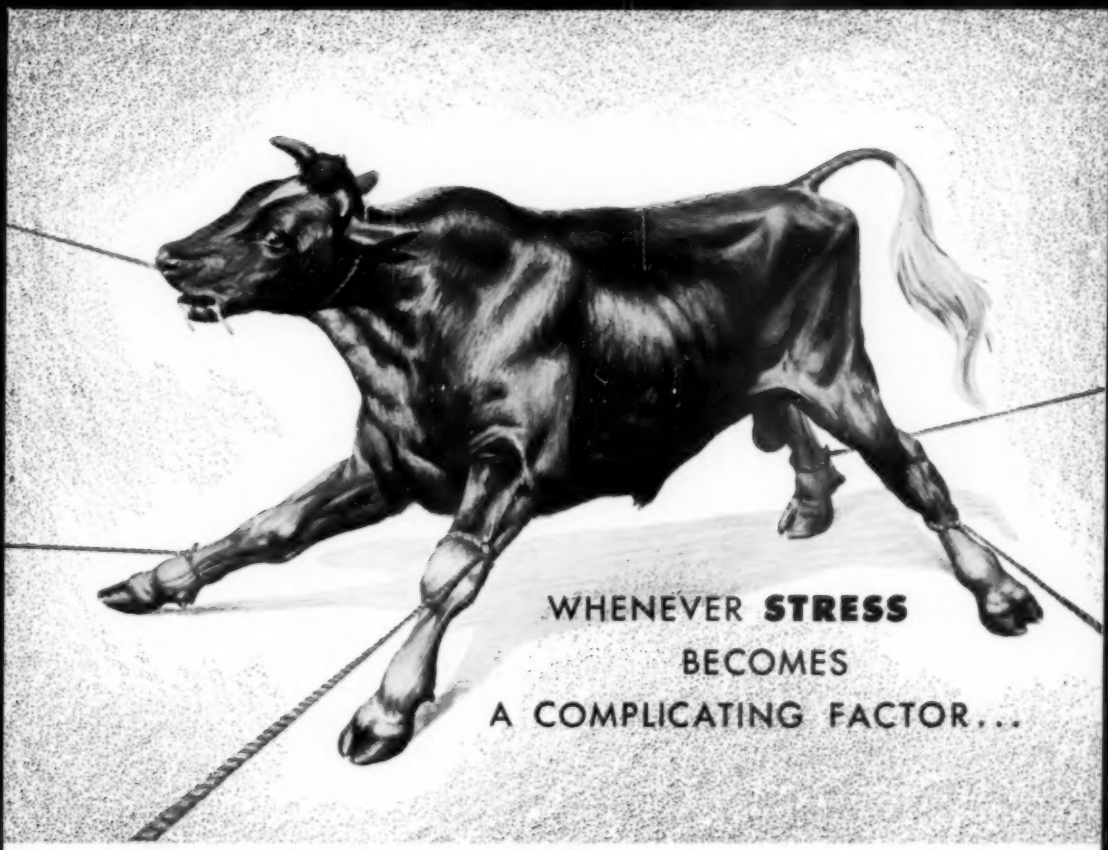

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VETERINARY

corticosteroid-antibiotic therapy... combining for enhanced therapeutic effectiveness in the treatment of pneumonias

METICORTEN, a superior antiinflammatory agent, plus
PENICILLIN, specific against gram-positive bacteria.

also indicated in
acute and secondary infections • foot rot • accident cases • surgical procedures
. . . extremely useful as supportive therapy

Packaging:

METICILLIN Aqueous Suspension Veterinary, 10 cc. vial, 10 mg. prednisone and 300,000 units procaine penicillin G in each cc., boxes of 1, 6, 72.

METICORTEN,* brand of prednisone.
METICILLIN,* brand of procaine penicillin for aqueous injection with prednisone.
*T.M. V-MN-J-117

SCHERING CORPORATION, BLOOMFIELD, NEW JERSEY

Schering

by effective control of both
the **inflammation and infection**

METIMYD OINTMENT with NEOMYCIN VETERINARY

the new topical therapy
combining METICORTELONE Acetate and two antibacterials, acts promptly to relieve excessive inflammatory and allergic reactions to infections, allergens and trauma. It has been found particularly effective in nonspecific eczemas, allergic skin disorders and ear canker.

METIMYD offers the assured Meti-steroid benefits of prednisolone acetate (0.5%), plus the wide range antibacterial action of sulfacetamide sodium (10%) and neomycin sulfate (0.25%).

Packaging: METIMYD Ointment, ⅛ oz. applicator tube, boxes of 1, 12, 36.

METICORTELONE,* brand of prednisolone.
METIMYD,* brand of prednisolone acetate and sulfacetamide sodium.
*T.M. V-MM-J-117

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SCHERING CORPORATION, BLOOMFIELD, NEW JERSEY

IN MASTITIS

CHECK inflammation promptly

ERADICATE infection

REDUCE secretory tissue damage

METIBIOTIC

mastitis infusion VETERINARY

bridge the therapeutic gap in mastitis by reducing inflammation. In METIBIOTIC the more potent antiinflammatory properties of METICORTEN complement the wide antibacterial spectrum of **penicillin-dihydrostreptomycin,** which are bactericidal to the majority of mastitis organisms.

This combined action results in prompt penetration of the clogged ducts and high, sustained antibiotic levels. Recovery is rapid, usually following a single infusion, and milk production returns to normal generally within 24 to 36 hours.

packaging:

METIBIOTIC Mastitis Infusion Veterinary, 7.5 cc. tube, boxes of 12, 72, 144.

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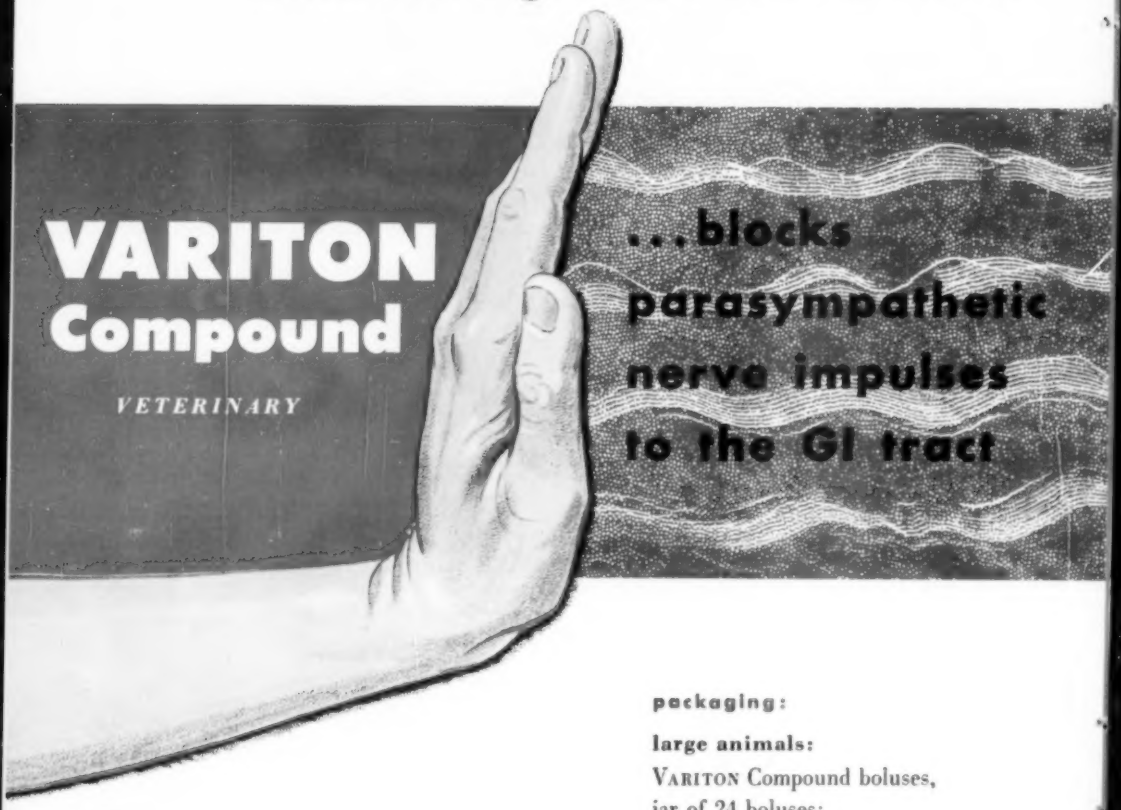
METICORTEN,® brand of prednisone.
METIBIOTIC,® brand of procaine penicillin-dihydrostreptomycin in oil with prednisone acetate.

®T.M. V-MB-J-117

double therapy

in diarrheas of animals, ***both*** *anticholinergic and antibacterial*



the anticholinergic, **diphemanil methylsulfate,** decreases peristalsis, reduces secretions and suppresses inflammation

the antibacterial, **phthalylsulfacetamide,** penetrates all layers of the intestinal wall for more effective treatment of enteric infections

packaging:

large animals:
VARITON Compound boluses,
jar of 24 boluses;
6 jars, 24 boluses per jar.

small animals:
VARITON Compound Tablets
bottle of 100.

VARITON® Compound, brand of diphemanil methylsulfate and phthalylsulfacetamide.

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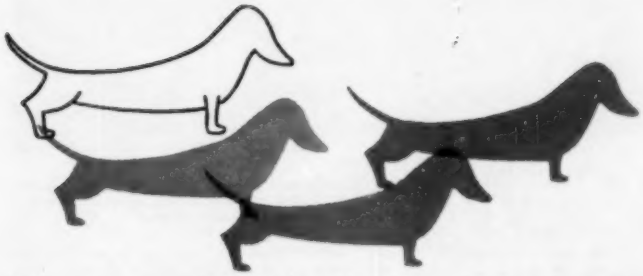

thousands of clinical cases prove that...

KOAGAMIN®

parenteral hemostat

arrests bleeding in minutes
prevents excessive blood loss

A Few Cases From The Literature[1]

CASE	DOSAGE OF KOAGAMIN	RESPONSE
Fox Terrier mammary tumor	1 cc. I.M., ½ hour preoperatively	"...capillary hemorrhage decreased to negligible...."
English Thoroughbred excise lachrymal duct	20 cc. I.V., at close of surgery	"...in 10 minutes bleeding had come to a practical stop...."
German Shepherd penal sarcoma	hemorrhage 5 hours postoperatively—3 cc. I.V.	"Bleeding lessened in 10 minutes...ceased in 20 minutes."
*Thoroughbred Gelding** amputate scirrhous cord	bleeding despite ligatures—10 cc. I.V., 10 cc. I.M.	"Seeping hemorrhage was arrested in 10 to 15 minutes."
Terrier panhysterectomy	Profuse bleeding during surgery—2 cc. I.M.; 2 cc. I.V., 10 minutes later	"...marked reduction in hemorrhage within 4 minutes... hemostasis in 10 minutes."

*N.B. A second thoroughbred under identical conditions but without KOAGAMIN: postoperative seeping hemorrhage—½ hour; oozing—an additional 2 hours.

KOAGAMIN, an aqueous solution of oxalic and malonic acids for parenteral use, is supplied in 20-cc. diaphragm-stoppered vials.

1. Rachman, M., and Frucht, T. R.: Vet. Med. *49*:341, 1954.

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Correspondence

Nov. 13, 1956

Editor, Small Animal Medicine:

Re: Article on "Fractures of the Neck of the Femur in the Dog" (Oct. 15, 1956: 354)

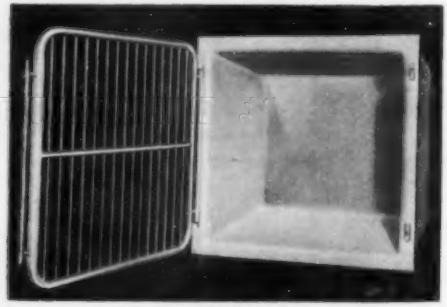
This article would have been much more convincing had the authors submitted some radiographs to prove their point. Certainly, if this procedure has merit, it would appear that out of a series of 20 animals, a set of radiographs could have been presented showing (*a*) the original injury, (*b*) the structures after surgical intervention, and (*c*) the end results at six months.

I have yet to see any radiographs showing end results in fractures of this nature. This report, therefore, is too glowing to accept without proof.

Reports of this nature tend to spur the novice with false hopes and to make the experienced fracture surgeon skeptical.

Sincerely yours,
s/Otto Stader, V.M.D.,
Ardmore, Pa.

The editors wish to obtain Part II of the *American Journal of Veterinary Research*, April, 1946, for a rinderpest eradication officer in India. Send to Editor, AVMA; 50c will be remitted.



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MANUFACTURING COMPANY
Vashon, Washington

or within a radius of 50 miles. W. E. Bewley, P.O. Box "H," Crestwood, secretary.

MARYLAND—Baltimore City Veterinary Medical Association, the second Thursday of each month, September through May (except December), at 9:00 p.m. at the Park Plaza Hotel, Charles and Madison St., Baltimore, Md. Harry L. Schultz, Jr., 9011 Harford Rd., Baltimore, Md., secretary.

MICHIGAN—Mid-State Veterinary Medical Association, the fourth Thursday of each month with the exception of November and December. Robert E. Kader, 5034 Armstrong Rd., Lansing 17, Mich., secretary.

Saginaw Valley Veterinary Medical Association, the last Wednesday of each month. S. Correll, Rt. 1, Midland, Mich., secretary.

Southeastern Veterinary Medical Association, the fourth Wednesday of every month, September through May. Gilbert Meyer, 14003 E. Seven Mile Rd., Detroit 5, Mich., secretary.

MISSOURI—Greater St. Louis Veterinary Medical Association, the first Friday of the month (except July and August) at the Sheraton Hotel, Spring Ave. and Lindell Blvd. Allen B. Shopmaker, 136 N. Meramec, Clayton 5, Mo., secretary.

Kansas City Small Animal Hospital Association, the first Monday of each month, at alternating hospitals. W. F. Noland, 7504 Metcalf, Overland Park, Kan., secretary.

Kansas City Veterinary Medical Association, the third Tuesday of each month at Exchange Hall, ninth floor, Livestock Exchange Bldg., 1600 Genessee St., Kansas City, Mo. Busch Meredith, 800 Woodswether Rd., Kansas City 5, Mo., secretary.

NEW JERSEY—Central New Jersey Veterinary Medical Association, the second Thursday of November, January, March, and May at Old Hights Inn, Hightstown, N. J. David C. Tudor, Cranbury, N. J., secretary.

Metropolitan New Jersey Veterinary Medical Association, the third Wednesday evening of each month from October through April at the Academy of Medicine, 91 Lincoln Park South, Newark, N. J. Myron S. Arlein, 2172 Milburn Ave., Maplewood, N. J., secretary.

Northern New Jersey Veterinary Association, the fourth Tuesday of each month at the Casa Mana in Teaneck. James R. Tanzola, Upper Saddle River, secretary.

Northwest Jersey Veterinary Society, the third Wednesday of every odd month. F. B. Duke, 49 Taylor St., High Bridge, N. J., secretary.

Southern New Jersey Veterinary Medical Association, the third Tuesday of each month at the Collingswood Veterinary Hospital, Collingswood. W. E. Snyder, E. Kings Highway and Munn Ave., Haddonfield, secretary.

NEW YORK—New York City, Inc., Veterinary Medical Association of, the first Wednesday of each month at the New York Academy of Sciences, 2 East 63rd St., New York City. C. E. DeCamp, 43 West 61st St., New York 23, N. Y., secretary.

Monroe County Veterinary Medical Association, the first Thursday of even-numbered months except August. Irwin Bircher, 50 University Ave., Rochester, N. Y., secretary.

NORTH CAROLINA—Central Carolina Veterinary Medical Association, the second Wednesday of each month at 7:00 p.m. in the O'Henry Hotel, Greensboro. Joseph A. Lombardo, 411 Woodlawn Ave., Greensboro, secretary.

Eastern North Carolina Veterinary Medical Association, the first Friday of each month. Wm. Allen Potts, 401 W. James St., Mount Olive, secretary.

Piedmont Veterinary Medical Association, the last Friday of each month. John G. Martin, Boone, N. Car., secretary.

OHIO—Cuyahoga County Veterinary Medical Association, the first Wednesday of each month, September through May (except January), at 9:00 p.m. at the Carter Hotel, Cleveland, Ohio. Ed. R. Jacobs, 5522 Pearl Rd., Cleveland, Ohio, secretary.

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piperazine citrate, PARLAM

eliminates WORMS in one treatment

'PARLAMATE' IS IDEAL for LARGE and SMALL ANIMAL USE

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DOSAGE FORMS

'PARLAMATE' Powder (contains 100% piperazine citrate). In preweighed dispensing packages convenient for office and field use.
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'PARLAMATE' Tablets, 250 mg. (each tablet contains the equivalent of 100 mg. available piperazine).
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- Safe, fast and most effective.
- Non-toxic and easily tolerated.
- No hair or feather staining, hepatic damage, gastro-intestinal irritation, or other serious side effects.
- No pretreatment starving or purging necessary.
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- Easily administered in feed or drinking water, or by dose syringe, drench or stomach tube.
- Only 1 treatment needed.
- 85-100% effective against mature and immature large roundworms (Ascaris) and nodular worms (Oesophagostomum).
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1956 marks Warner-Chilcott's 100th year of service to the medical profession, producing ethical drugs and pioneering in pharmaceutical research.

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a NEW nonsedative
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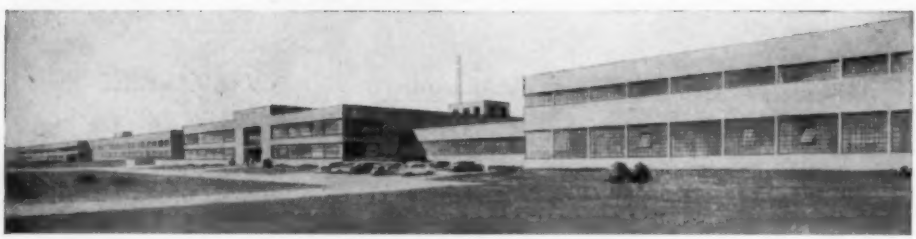

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before Paxital

30 minutes after Paxital

to calm the vicious dog

Paxital, a new animal tranquilizer designed exclusively for veterinary use, produces a peaceful mental state *without sedation.* Animals remain normally responsive to surroundings. Paxital controls anxiety, nervousness and apprehension. It also appears to have a significant analgesic effect. Paxital is useful to eliminate barking and relieve nervousness or tension, especially in hospitalized animals. It is of value to reduce biting and scratching in skin conditions . . . for minor surgery when a general anesthetic is contraindicated or undesirable . . . as an adjunct in major surgery to permit smoother induction of anesthesia and an uneventful recovery (and to reduce the amount of barbiturates necessary) . . . to counteract shock and as an antiemetic.

Dosage: Average dose (for 20 to 30 lb. dog): *orally*—50 to 100 mg. two or three times daily, as indicated; *parenterally*—2 cc. (50 mg.) I.V., I.M. or subcutaneously. Occasionally, an additional 2 cc. may be required to obtain the desired clinical response. Tranquilization is obtained usually within 45 minutes following oral administration. Onset of action following parenteral administration is more rapid.

Contraindications: Hepatic diseases or disorders. Central nervous system involvement.

Packaging: 25 and 50 mg. tablets in bottles of 100 and 500; 2 cc. ampuls (25 mg./cc.) in boxes of 10 and 50.

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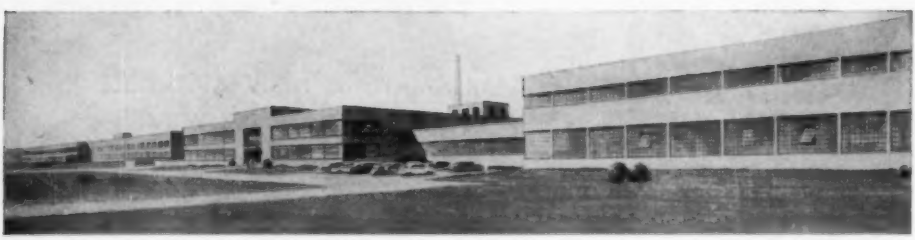

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OKLAHOMA—Oklahoma County Veterinary Medical Association, the second Wednesday of every month. James M. Brown, 2818 W. Britton Rd., Oklahoma City, secretary.

Tulsa Veterinary Medical Association, the third Thursday of each month in Directors' Parlor of the Brookside State Bank, Tulsa, Okla. Don L. Hohmann, 538 S. Madison St., Tulsa, Okla., secretary.

PENNSYLVANIA—Keystone Veterinary Medical Association, the fourth Wednesday of each month at the University of Pennsylvania School of Veterinary Medicine, 39th and Woodland Ave., Philadelphia 4, Pa. Raymond C. Snyder, 39th and Woodland Ave., Philadelphia 4, Pa., secretary.

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SOUTH CAROLINA—Piedmont Veterinary Medical Association, the third Wednesday of each month at the Fairforest Hotel, Union, S. Car. Worth Lanier, York, S. Car., secretary.

TEXAS—Coastal Bend Veterinary Association, the second Wednesday of each month. J. Marvin Prewitt, 4141 Lexington Blvd., Corpus Christi, Texas, secretary.

VIRGINIA—Central Virginia Veterinarians' Association, the third Thursday of each month at the William Byrd Hotel in Richmond at 8:00 p.m. M. R. Levy, 312 W. Cary St., Richmond 20, Va., secretary.

Northern Virginia Veterinary Society, the second Wednesday of every third month. Meeting place announced by letter. H. C. Newman, Box 145, Merrifield, Va., secretary.

Southwest Virginia Veterinary Medical Assocciation, the first Thursday of each month. I. D. Wilson, Blacksburg, secretary.

WASHINGTON—Seattle Veterinary Medical Association, the third Tuesday of each month in the Trinity Episcopal Church, 8th and James St., Seattle, Wash. P. R. Des Rosiers, 5508 2nd Ave., N. W., Seattle 7, Wash., secretary.

South Puget Sound Veterinary Association, the second Thursday of each month except July and August. O. L. Bailey, P. O. Box 906, Olympia, Wash., secretary.

WEST VIRGINIA—Kyowva (Ky., Ohio, W. Va.) Veterinary Medical Association, the second Thursday of each month in the Hotel Prichard, Huntington, W. Va., at 8:30 p.m. Harry J. Fallon, 200 5th St., W. Huntington, W. Va., secretary.

WISCONSIN—Milwaukee Veterinary Medical Association, the third Tuesday of each month, at the Half-Way House, Blue Mound Rd. George F. Lynch, 201 West Devon St., Milwaukee 17, Wis., secretary.

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Full-time assistant wanted in mixed practice, central New York; new small animal hospital and dairy practice. Salary plus bonus determined by experience. New York license. Give references, training, experience, age, marital status; recent graduate desired. Address "Box Y 25," c/o JOURNAL of the AVMA.

Delaware has a vacancy for a qualified veterinarian in regulatory work. Salary commensurate with qualifications. Address Dr. W. R. Teeter, State Veterinarian, Dover, Del.

Assistant wanted for busy small animal practice, western New York. Modern new hospital; opportunity to buy into business soon. Address "Box Y 27," c/o JOURNAL of the AVMA.

Experienced veterinarian wanted for 4 weeks; fill in for vacation either January, February, or March, 1957. Small animal hospital, Chicago area; living quarters. Write stating school, age, experience, and salary expected. Address "Box A 1," c/o JOURNAL of the AVMA.

Veterinarian wanted as assistant for modern, well-equipped small animal hospital in Missouri. State qualifications and salary expected in first letter. Experience desirable. Address "Box A 6," c/o JOURNAL of the AVMA.

Young, ambitious, capable, single veterinarian wanted for public relations and sales work with established ethical veterinary supply company serving Alabama, Florida, and Georgia. Salary and commission dependent upon training and experience. Must be able to remain in field for 5 days and 4 nights every week, excepting 2 weeks paid vacation period eligible after 1 year employment. Car and traveling expenses furnished. Address Mr. Carl Sutton, The Albany Serum Company, 3rd and Front Sts., Albany, Ga.

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Veterinarian wanted for extensive general practice in Illinois; can lead to profit-sharing basis. State availability, experience, and other key information. Address "Box A 10," c/o JOURNAL of the AVMA.

Veterinarian wanted as assistant in small animal practice. Address Dr. Morton Meisels, 268 Broadway, East Paterson, N.J.

Wanted—Positions

Young German veterinary surgeon, graduated from Munich, 1955 (graduates of this year are recommended by AVMA for recognition by State Boards and other agencies) experienced in all kinds of veterinary practice, especially large animals, including artificial insemination and treatment of infertility; interested in surgery; wishes to contact practitioner or animal clinic with view to long assistantship. Presently working in Ireland. Available June 1957. Address Dr. H. J. Neumann, Emly, Tipperary, Ireland.

Successful veterinarian, diversified experience, presently engaged in general practice, 1943 graduate, desires challenging position with ethical pharmaceutical company, research establishment, or university with advancement possibilities. Address "Box A 3," c/o JOURNAL of the AVMA.

Graduate veterinarian desires position on meat and milk inspection for city, county, or state. Experienced. Address "Box A 4," c/o JOURNAL of the AVMA.

Position wanted by graduate of recognized school, D.V.M., M.S. (physiology). Three years of experience in basic research and 7 years in clinical evaluation of new products and practice; special interest in physiology, pharmacology, endocrinology, and care of laboratory animals. Reprints of published articles available. Seeking position with primarily research duties. Available shortly. Address "Box A 11," c/o JOURNAL of the AVMA.

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Small animal hospital wanted in Chicago area, northern Indiana, or lower Michigan. Established, active practice preferred. Can take over in spring. Capable and experienced. Address "Box A 9," c/o JOURNAL of the AVMA.

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Large 6-room house; excellent condition, on busy 4-lane highway, Scarsdale, N.Y. Used 30 years as a boarding kennel; excellent site for a veterinarian. For rent at $275 per month. Address D. Sapey, 636 Central Ave., Scarsdale, N.Y.

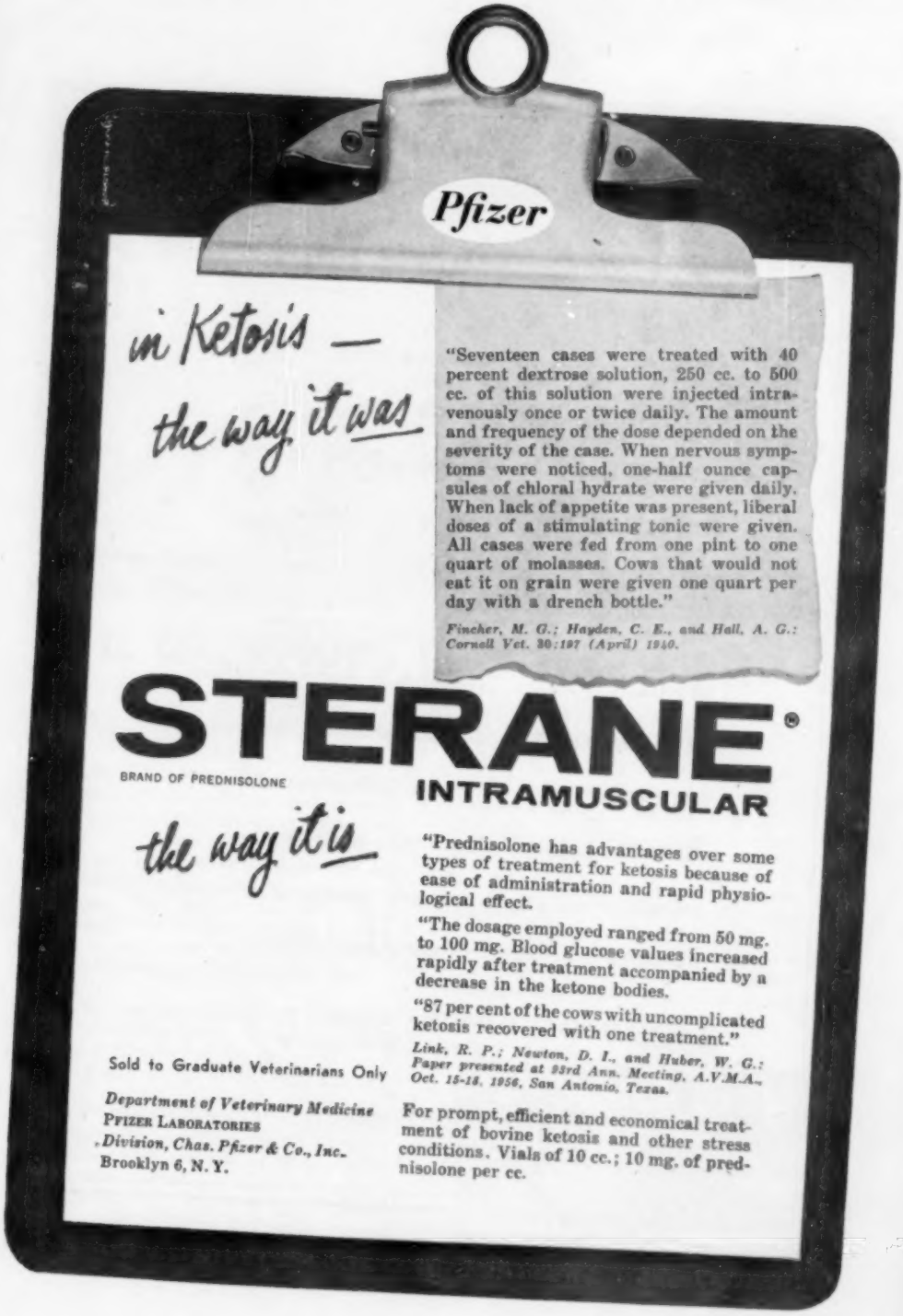
For Sale or Lease—Practices

Small animal practice for sale in Massachusetts; $16,000 includes large home and combined hospital plus instruments, equipment, and drugs. No com-

(Continued on p. 39)

Changes in Veterinary Personnel at Merck & Co.

Merck & Co., Inc., announces the transfer of Dr. Donald Fogg from their newly purchased poultry experimental farm near Cheswold, Del., which he managed, to Rahway, N. J., where he will become supervisor of poultry diseases under Dr. Alexander Zeissig, director of the Veterinary Department. Dr. James E. Porter will replace Dr. Fogg as manager of the Cheswold Farm.



in Ketosis —
the way it was

"Seventeen cases were treated with 40 percent dextrose solution, 250 cc. to 500 cc. of this solution were injected intravenously once or twice daily. The amount and frequency of the dose depended on the severity of the case. When nervous symptoms were noticed, one-half ounce capsules of chloral hydrate were given daily. When lack of appetite was present, liberal doses of a stimulating tonic were given. All cases were fed from one pint to one quart of molasses. Cows that would not eat it on grain were given one quart per day with a drench bottle."

Fincher, M. G.; Hayden, C. E., and Hall, A. G.: Cornell Vet. 30:197 (April) 1940.

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"Prednisolone has advantages over some types of treatment for ketosis because of ease of administration and rapid physiological effect.

"The dosage employed ranged from 50 mg. to 100 mg. Blood glucose values increased rapidly after treatment accompanied by a decrease in the ketone bodies.

"87 per cent of the cows with uncomplicated ketosis recovered with one treatment."

Link, R. P.; Newton, D. I., and Huber, W. G.: Paper presented at 93rd Ann. Meeting, A.V.M.A., Oct. 15-18, 1956, San Antonio, Texas.

Sold to Graduate Veterinarians Only

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PFIZER LABORATORIES
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For prompt, efficient and economical treatment of bovine ketosis and other stress conditions. Vials of 10 cc.; 10 mg. of prednisolone per cc.

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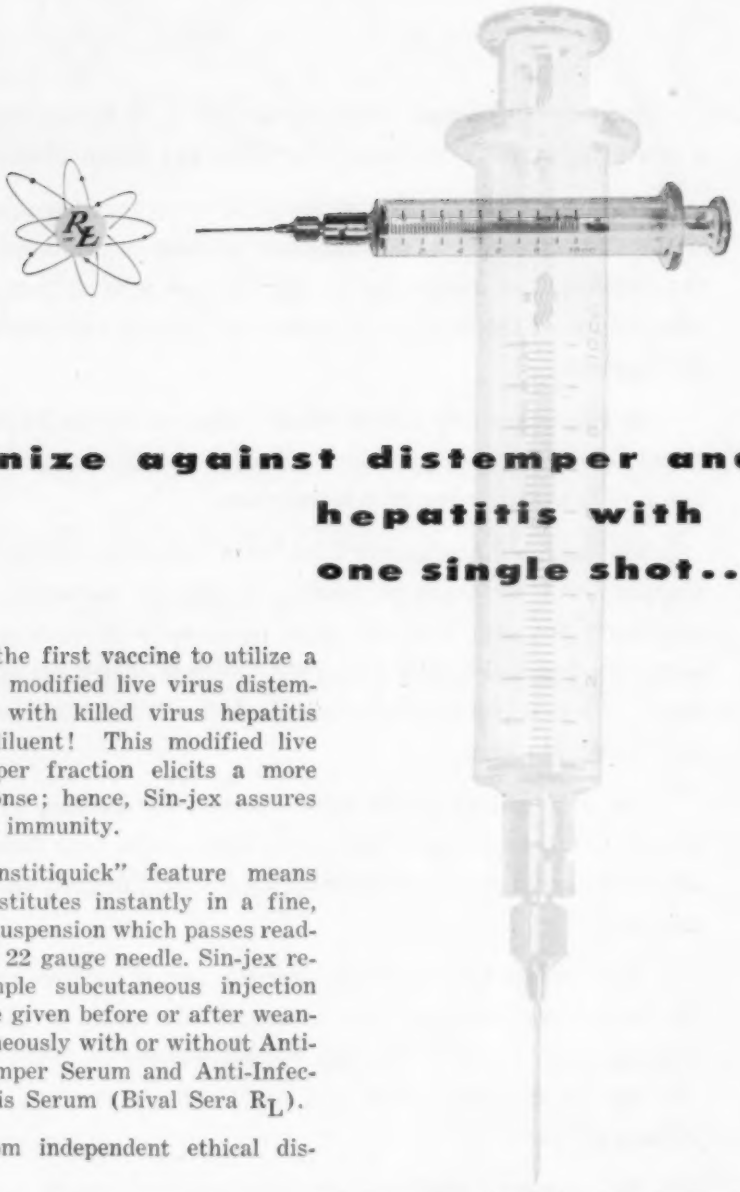

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